



# Cost Analysis Methodology For Demand-Responsive Service

## October 1988

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# **COST ANALYSIS METHODOLOGY FOR DEMAND-RESPONSIVE SERVICE**

**Prepared for**

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Mass Transit Administration  
Management Analysis and Program Department**

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## FOREWORD

This workbook was developed to assist users in identifying and understanding the costs of their transportation services. The workbook covers the development of methods for both cost allocation and cost estimation. While the examples in the workbook use the chart of accounts for the Maryland Mass Transit Administration, the methodology can be applied to all transit systems which have a complete set of accounts.

The workbook was written for demand-responsive services. The methodology can also be applied to small fixed-route services where the operating characteristics (e.g., span of service, peak-to-base bus requirements) of individual bus routes do not vary significantly.

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## INTRODUCTION

This workbook is designed to assist local jurisdictions and non-profit agencies which receive transportation statewide program funds in identifying and understanding their costs of transportation. Identifying and understanding costs will enable agencies to manage their operations more efficiently and to compare their operating costs with those of other operators providing the same service.

As such, this workbook provides guidance and information on two principal topics; namely, **cost allocation** and **cost estimation**. **Cost allocation** really means: How much does it cost to operate an existing service? This issue is important because it deals with the distribution or allocation of total costs among funding services to the individual routes or services provided by a local jurisdiction or non-profit agency. Knowing the costs of individual routes or services is useful for management purposes and for satisfying the competitive bidding requirements mentioned in the Urban Mass Transportation Administration's Private Enterprise Policy.

**Cost estimation**, on the other hand, really means: How much will it cost to change an existing service? This issue is important because it deals with the cost increases or decreases that will likely accompany an expansion or reduction in service. Knowing these cost impacts is useful in developing budgets for the immediate future.

Overall, then, this workbook offers methods and information for determining and estimating costs. The workbook is divided into five chapters as follows:

- o Chapter 1 is concerned with the nature of costs themselves. Basic cost concepts (e.g., capital and operating costs) are introduced to provide a common understanding of the terms that are used throughout this workbook.
- o Chapter 2 focuses on the steps that are used in developing a universally-accepted cost allocation approach. The resultant cost allocation model is particularly useful for distributing total system costs among funding sources and to individual routes or services.

- o Chapter 3 is concerned with modifying the baseline model so that it can be used in conjunction with the UMTA Private Enterprise Policy. Emphasis here is on refining the cost method so that defensible and accurate cost estimates can be prepared that are consistent with federal guidelines.
- o Chapter 4 focuses on developing cost models for future years. In this manner, inflation and other anticipated changes are taken into account in adjusting agency expenses during an upcoming period such as a contract term covered in a competitive bidding situation.
- o Chapter 5 is concerned with modifying the cost model to estimate short-term cost impacts. The issue here is on adjusting the model to estimate costs that are likely to be saved or incurred by a public agency during the length of a service contract.

A step-by-step example using data from the Urban Rural Transportation Alliance (URTA) in Howard County is presented to demonstrate the application of the proposed cost allocation and cost estimation methodologies. URTA operates 15 vehicles and provides almost 500,000 annual miles of service. This example is particularly geared to the requirements of demand-responsive and non-profit transportation providers. A companion workbook has been prepared for fixed-route operators using data from the Washington County Transportation Commission services in metropolitan Hagerstown.

It should be noted that since the new version of the Mass Transit Administration (MTA) chart of accounts was only instituted in July, 1987, an annual expense statement based on these accounts was not available for the URTA. As a result, the first four months of data for Fiscal Year 1988 were "annualized" for use in this workbook. In addition, some changes were made to the URTA data for illustrative purposes (e.g., it was assumed that URTA is a multi-purpose agency with an executive director administering transportation and other functions). Thus, the models developed in the example reflect a "hypothetical" version of URTA operations.

This chapter discusses the nature of costs and introduces basic cost concepts that will be used throughout this workbook. These basic cost concepts include:

- o Capital and operating costs;
- o Fixed and variable costs;
- o Direct and shared costs; and
- o Explicit and implicit costs.

It is important to note that each of these paired concepts (e.g., capital and operating costs) are expressions of **total** costs. Total costs include all public sector costs regardless of the source of government funding. This means that all operating and capital subsidies that are received from local, state and federal governments must be considered in the analysis of cost. The perspective of the **national** taxpayer is used in cost analysis. While government subsidies may be considered as "free" from the transit or social service agency's viewpoint, they are still costs in the form of taxes that are borne by the citizenry as a whole.

**Capital costs** refer to the expenses associated with long-term physical acquisitions such as vans, buses, garages and maintenance facilities (See Exhibit 1). These assets have a physical or functional life which extends over several years. Each year, these assets lose value. This loss in value is known as depreciation or the annual cost of capital. In this context, total depreciation costs are considered rather than just the amount represented by the local share.

**Operating costs** refer to those expenses that are consumed in a single calendar or fiscal year to operate the transit system. (See Exhibit 1). These expenses include labor, materials and supplies (e.g., fuel) which are essential to operating the system.

Taken together, capital and operating costs equal 100% of total costs.

# EXHIBIT 1

## CAPITAL AND OPERATING COSTS

### CAPITAL COSTS

- Vans
- Maintenance Facilities
- Other Long-term Physical Acquisitions



### OPERATING COSTS

- Labor
- Benefits
- Materials & Supplies
- Other Expenses Consumed in Operations



100 % of Costs

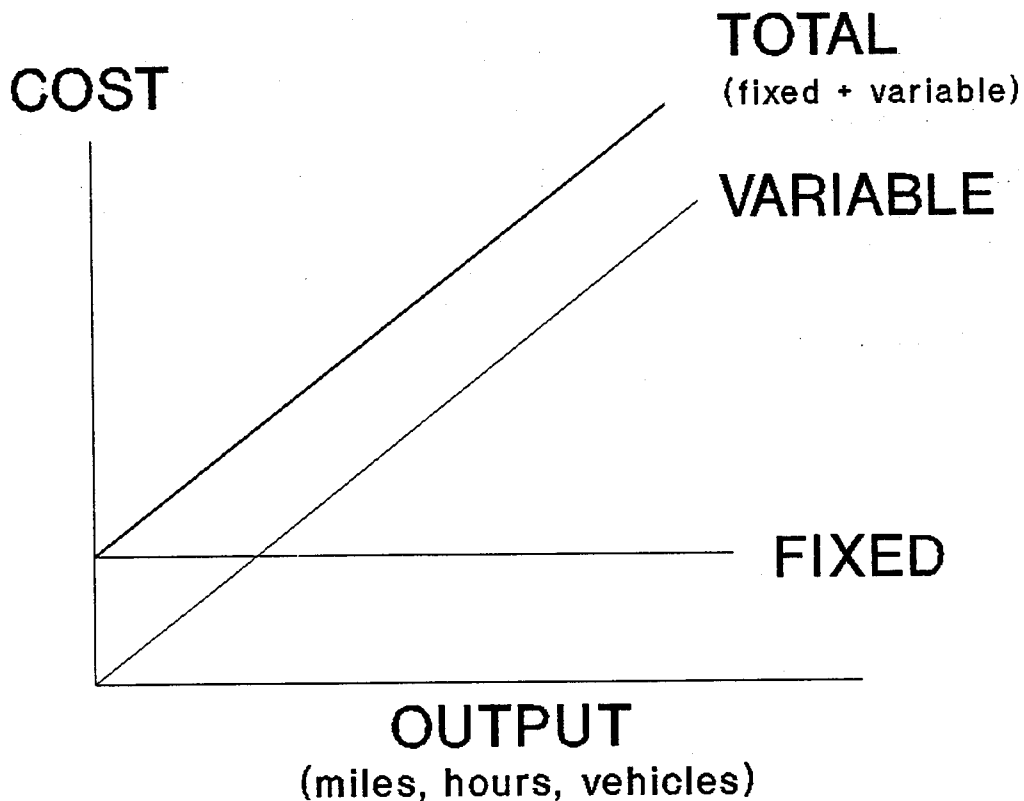
**Fixed costs** are those which **do not** vary with the amount of service provided (See Exhibit 2). In most systems, this means that these costs remain unchanged regardless of the number of hours, miles or vehicles operated. Fixed costs typically include such items as administrative salaries and facility depreciation.

**Variable costs** are those which **do** change with the amount of service provided (See Exhibit 2). These expenses typically include driver wages, fuel costs and maintenance costs.

The total costs of providing transit service equals the sum of all fixed and variable costs.



## EXHIBIT 2 FIXED AND VARIABLE COSTS



- Fixed Costs do not vary with the amount of service provided (e.g., administrative salaries, facility-related capital costs)
- Variable Costs change with the amount of service provided (e.g., drivers' wages, fuel costs, maintenance costs)

**Direct costs** are those expenses that **can be** associated on a one-to-one basis with a given service (See Exhibit 3). Examples of these costs include operator labor, fuel costs and maintenance costs. Generally, most of the direct costs of transportation service are variable costs.

**Shared costs** are those which **cannot** be associated on a one-to-one basis with a given transportation service (See Exhibit 3). These costs are representative of functions which often support more than one service. At the individual service level, examples include administrative salaries and facility-related capital costs. Shared costs are generally fixed costs and they must be allocated on a reasonable basis to individual transportation services in agencies operating more than one service.

The issue of shared costs is somewhat more complex for many social service agencies as opposed to "pure" transit systems. In many such agencies, transportation is only one of several functions performed by the organization. In such cases, the allocation of shared costs requires a two-step process:

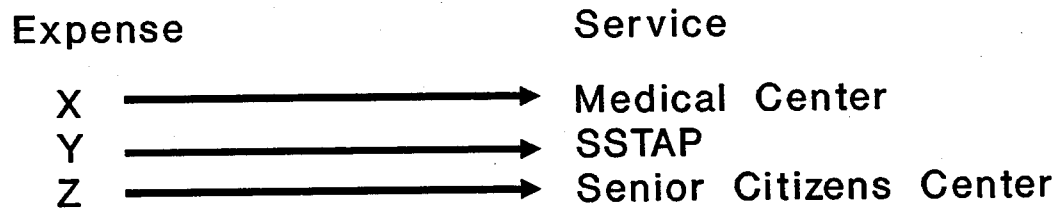
- (1) Allocate shared expenses by function (e.g., distribute the executive director's salary between the transportation function and other functions such as meals, vocational counseling and special events perhaps on the basis of time); and
- (2) Allocate the resultant transportation expense among the services offered (e.g., distribute the transportation portion of the executive director's salary among the transportation services provided by the agency).

The shared cost concept can be applied to allocate cost to multiple funding sources within a transportation service or transportation department of a larger agency.

## EXHIBIT 3

### DIRECT AND SHARED COSTS

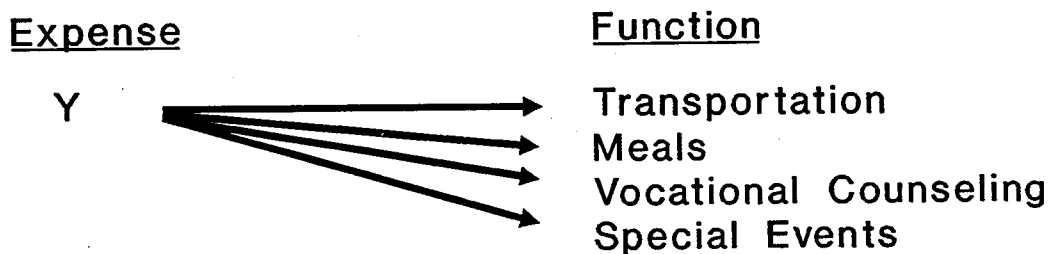
- Direct Costs can be associated on a one-to-one basis with a given service (e.g., operator labor, fuel, maintenance costs).



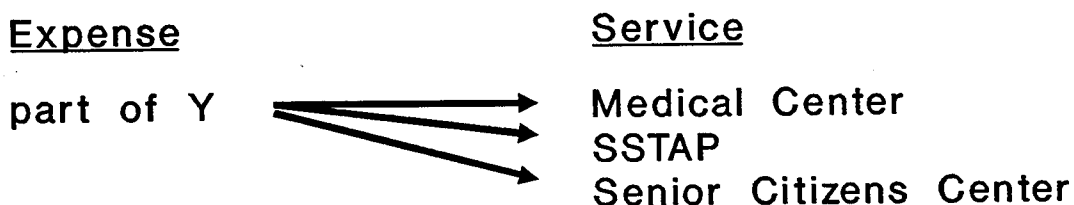
- Shared Costs cannot be associated on a one-to-one basis with a given function or service (e.g., administrative salaries).

Two steps are involved:

1. Allocate expenses to functions.



2. Allocate transportation expenses to services.



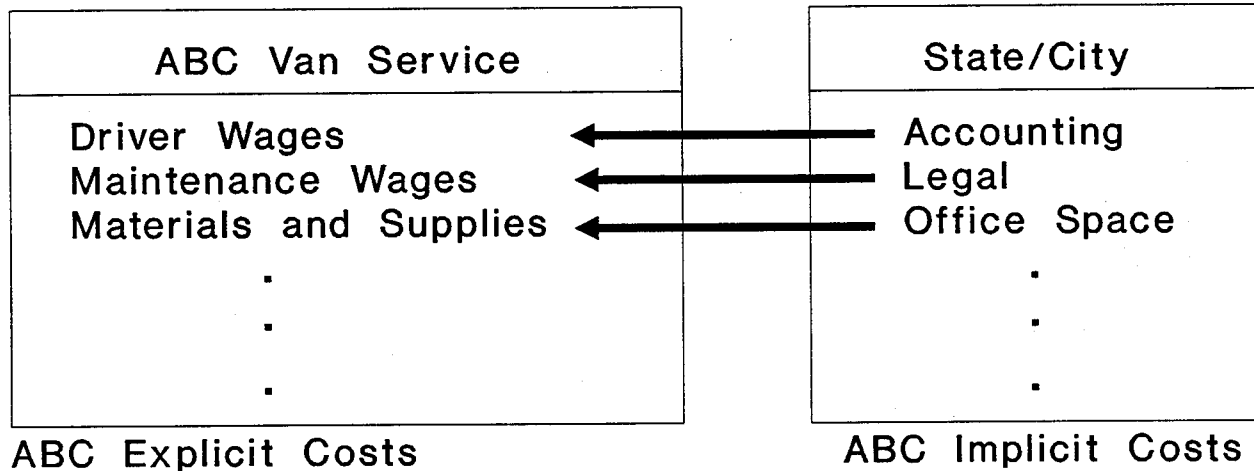
**Explicit costs** are those costs which appear on the agency's revenue and expense statement (See Exhibit 4). Explicit costs refer to those expenses that require a cash outlay during the year or at the time when a capital asset is acquired. Examples include driver wages, maintenance wages, materials and depreciation.

**Implicit costs** refer to those resources that may be used by an agency even though they may not be reflected on the revenue and expense statement (See Exhibit 4). These costs are, nevertheless, borne by the general taxpayer and may include accounting or legal services provided by a municipal government to a transit or social service agency. To satisfy the doctrine of total costs, every effort should be made to determine those resources that are implicitly provided to the system.

For many social service and rural transportation ventures, the correct identification of implicit costs is an important issue. In many cases, these agencies receive publicly-donated and privately-donated services as well. For example, a municipal government may provide office space while volunteer drivers may be used to provide service. From a total cost perspective, only publicly-donated services should be counted as implicit costs since these are supported by the taxpayer-at-large. Privately-donated services, while important to the viability of the system, are not considered to be legitimate costs since they are not taxpayer supported.

## EXHIBIT 4

### EXPLICIT AND IMPLICIT COSTS





This chapter describes the process for developing a three-variable cost allocation model which can be used to distribute total system costs to different funding sources or individual routes or services. Topics that are covered in this chapter include the following:

- o Three-variable model overview;
- o Three-variable model development; and
- o Three-variable model application.

### **Three-Variable Model Overview**

One approach commonly used to allocate costs to individual services is known as a three-variable, fully allocated cost model. This model is a relatively simple equation which uses hours, miles and vehicles as the three variables.

The equation is:

$$\text{Annual Total Cost} = (\text{Cost per hour} * \text{Annual hours of operation}) + (\text{Cost per mile} * \text{Annual miles of operation}) + (\text{Cost per Vehicle Operated} * \text{Number of Vehicles in Service})$$

Applying this model involves calculating your cost per hour, cost per mile, and the cost to operate a vehicle and applying these costs to the annual hours of operation, miles or vehicles in service.

For example, assume that it costs:

\$7.32 per hour of service  
\$0.31 per mile of service  
\$23,332.69 per vehicle operated

To find the cost of operating one vehicle that travelled 33,000 annual miles in 2,100 hours of operation, the equation would be:

$$\begin{aligned}\text{Annual Total Cost} &= (\$7.32 * 2,100) + (\$0.31 * 33,000) + \\ &\quad (\$23,332.69 * 1) \\ &= \$48,935\end{aligned}$$

The three-variable model is probably the most widely-accepted, fully allocated cost mechanism used in the transit industry today for the following reasons:

- o The model is inherently simple. Thus, it is easy to understand, develop and apply and is compatible with the operating environments common in the State of Maryland. In most cases, such a model can be developed initially in only a few hours even by relatively non-technical personnel.
- o The model is all-inclusive. The model takes into account all of the explicit costs contained in a typical revenue and expense statement. Moreover, the model can easily accommodate implicit costs as well.
- o The model is extremely flexible and can be utilized to analyze various categories of total cost as needs dictate. For example, an operating cost model can be developed from this fully-allocated approach by merely omitting depreciation expense from the analysis. Likewise, budgetary impacts can be readily ascertained by focusing on the variable costs of service.





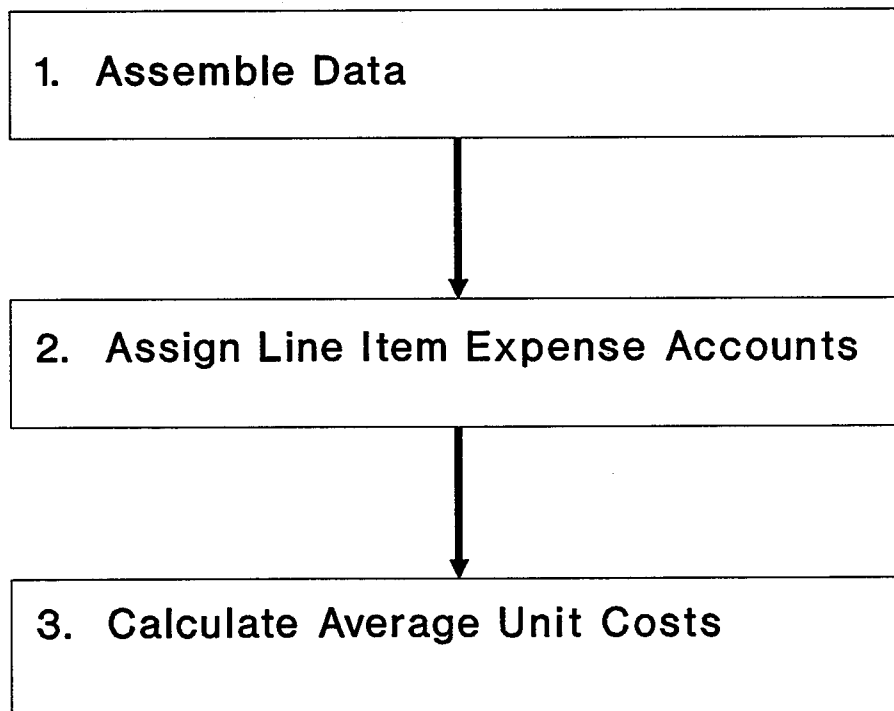
The development of the baseline model involves the following three steps (See Exhibit 5):

- (1) Assemble data;
- (2) Assign line item expense accounts to the three resource variables (i.e., hours, miles and vehicles);  
and
- (3) Calculate average unit costs.

Each of these steps is described below.

## **EXHIBIT 5**

### **THREE-VARIABLE MODEL DEVELOPMENT**



**Step 1: Assemble Data**

Most of the data that are used to calibrate the model can be obtained from the most recent revenue and expense statement. Since all of the transportation providers in Maryland are required to submit monthly financial statements, the MTA chart of accounts will be used as the basis for developing the model (See Exhibit 6). In this example, the URTA expenses totalled \$612,826 during the reporting period.

Exhibit 6

NTA Chart of Accounts

URTA Example

Expense Object Class	Reported Expense
VEHICLE OPERATIONS	
DRIVERS SALARIES	179,760
DISPATCHERS SALARIES	28,047
PSSNGR. AID SALARIES	1,477
FRINGE BENEFITS	34,578
FUEL OIL	43,872
TUBES & TIRES	5,103
VEHICLE INSURANCE	34,734
VEHICLE LEASE	0
VEHICLE DEPRECIATION	18,723
VEH LICENSE, REG, TAX	175
VEH STORAGE FAC RNTL	2,376
OTHER	489
MAINTENANCE	
MECHANICS SALARIES	11,088
OTHER WAGES	20,256
FRINGE BENEFITS	7,104
CASUALTY/LIABILITY	0
MAINTENANCE SVC CONTR	0
MATERIALS & SUPPLIES	10,788
MAINT FACILITY RNTL	0
EQUIPMENT RENTAL	0
UTILITIES	0
SERVICES	28,124
OTHER	0
NON-VEHICLE MAINTENANCE	
JANITORIAL WAGES	0
FRINGE BENEFITS	0
SERVICES	0
MATERIALS/SUPPLIES	0
OTHER	0
ADMINISTRATION	
ADMINISTRATORS SALARY	34,524
MANAGERS SALARY	18,672
DISPATCHERS SALARY	0
SECRETARYS SALARY	14,790
BOOKKEEPERS SALARY	0
OTHER SALARY	0
FRINGE BENEFITS	9,345
MATERIALS/SUPPLIES	9,336
CASUALTY/LIABILITY	10,044
FUEL SVC VEHICLE	0
TAXES	0
SERVICES	2,115
PURCHASED TRANSP	67,380
EXPENSE TRANSFERS	0
INTEREST EXPENSE	0
AMORT OF INTANGIBLES	0
TELEPHONE	3,336
OFFICE RENTAL	12,156
UTILITIES	0
OFFICE EQPT RENTAL	3,513
OTHER	921
Totals	\$612,826

The values for the resource variables (i.e., the number of hours, miles and vehicles) are also obtained from the monthly statements (See Exhibit 7). In this example, the URTA operated 28,811 hours, 473,512 miles and 13 vehicles during the reporting period. Note that the URTA owns 15 vehicles but, only 13 vans are required for day-to-day operations. Two of the vehicles are spares.

It should be noted that both the financial and operational data represent values for a full 12-month period. Since some expenses occur only periodically (e.g., insurance premiums), all costs may not be reflected on the ledger sheet if less than a 12-month period is used in the analysis.

# **EXHIBIT 7**

## **ANNUAL VALUES OF RESOURCE VARIABLES**

### **URTA Example**

<b>Total Annual Hours</b>	<b>28,811</b>
<b>Total Annual Miles</b>	<b>473,512</b>
<b>Number of Vehicles in Service</b>	<b>13</b>

While the majority of the operating data can be directly used in calibrating the model, data for some expense items must be modified or obtained from other sources. These adjustments are, for the most part, related to the need to accurately account for both shared and implicit costs. There are five common modifications; some agencies may have more depending upon their operations. The five modifications that must be made to the operating data are as follows:

1. **Replace general fringe benefit accounts with detailed fringe benefit accounts.** Fringe benefit expenses are reported on the MTA financial statement by general function class (i.e., vehicle operations, maintenance, non-vehicle maintenance and administration). Each general fringe benefit account represents the total fringe benefits paid to employees in that functional class. For example, the line item expense account **Vehicle Operations: Fringe Benefits** includes the fringe benefits paid to drivers, dispatchers and passenger aids.

Developing the model is simplified if these general fringe benefit categories are replaced by detailed fringe benefit accounts. Separate computations for fringe benefits are maintained by most transportation providers in their accounting systems. In this example, it is assumed that the URTA does maintain the desired breakdown for fringe benefits (See Exhibit 8).



**Exhibit 8**

**Detailed Fringe Benefit Categories**

**URTA Example**

Expense Object Class	Reported Expense
<b>VEHICLE OPERATIONS</b>	
DRIVERS SALARIES	179,760
DISPATCHERS SALARIES	28,047
PSSNGR. AID SALARIES	1,477
DRIVERS FRINGES	30,191
DISPATCHERS FRINGES	4,387
PASSENGER AID FRINGES	0
FUEL OIL	43,872
TUBES & TIRES	5,103
VEHICLE INSURANCE	34,734
VEHICLE LEASE	0
VEHICLE DEPRECIATION	18,723
VEH LICENSE, REG, TAX	175
VEH STORAGE FAC RNTL	2,376
OTHER	489
<b>MAINTENANCE</b>	
MECHANICS SALARIES	11,088
OTHER WAGES	20,256
MECHANICS FRINGES	3,035
OTHER FRINGES	4,069
CASUALTY/LIABILITY	0
MAINTENANCE SVC CONTR	0
MATERIALS & SUPPLIES	10,788
MAINT FACILITY RNTL	0
EQUIPMENT RENTAL	0
UTILITIES	0
SERVICES	28,124
OTHER	0
<b>NON-VEHICLE MAINTENANCE</b>	
JANITORIAL WAGES	0
FRINGE BENEFITS	0
SERVICES	0
MATERIALS/SUPPLIES	0
OTHER	0
<b>ADMINISTRATION</b>	
ADMINISTRATORS SALARY	34,524
MANAGERS SALARY	18,672
DISPATCHERS SALARY	0
SECRETARYS SALARY	14,790
BOOKKEEPERS SALARY	0
OTHER SALARY	0
ADMINISTRATORS FRINGES	4,738
MANAGERS FRINGES	2,545
DISPATCHERS FRINGES	0
SECRETARYS FRINGES	2,062
BOOKKEEPERS FRINGES	0
OTHER FRINGES	0
MATERIALS/SUPPLIES	9,336
CASUALTY/LIABILITY	10,044
FUEL SVC VEHICLE	0
TAXES	0
SERVICES	2,115
PURCHASED TRANSP	67,380
EXPENSE TRANSFERS	0
INTEREST EXPENSE	0
AMORT OF INTANGIBLES	0
TELEPHONE	3,336
OFFICE RENTAL	12,156
UTILITIES	0
OFFICE EQPT RENTAL	3,513
OTHER	<u>921</u>
<b>Totals</b>	<b>\$612,826</b>

- 2a. **Modify depreciation accounts to include the full costs of capital assets - Calculate Full Depreciation Costs.** The depreciation expense that is reported in the MTA financial statement includes only the local share of the capital assets owned by the agency. This expense must be adjusted to include the full depreciation charge since all subsidies received from local, state and federal levels of government must be considered in the cost analysis.

This adjustment can be accomplished in one of two ways. First, the agency's financial manager can be consulted and the depreciation schedule of all assets can be reviewed to ensure that full capital costs are being used in the analysis. Second, the reported depreciation charge for each asset can be reviewed and adjusted accordingly.

In the URTA example, the second approach was followed in modifying the line item expense account concerned with depreciation. Here, the depreciation expense was increased from \$18,723 to \$29,447 to reflect the full depreciation charge for two of the URTA's fifteen vehicles (See Exhibit 9). In essence, the depreciation expense for vehicles 24 and 25 was reported to be \$1,592 and \$1,089, respectively. However, this reported expense amount represented the local share only. As a result, these values were expanded fivefold (i.e., from 20% to 100%) to \$7,960 and \$5,445, respectively, to reflect the full depreciation cost. Note that the "expansion factor" is likely to vary with local conditions.

Three additional vehicles are currently being depreciated on a full cost basis and, thus, require no adjustment. The remaining ten vehicles are fully depreciated because they have exceeded the recommended economic life of four years and, therefore, no charges are reflected on the agency's vehicle depreciation schedule for these vans. Finally, no changes were made to radio or miscellaneous expenses since the depreciation charges for these items were based on full purchase costs.

# Exhibit 9

## Calculation of Full Depreciation Costs

### URTA Example

Item Number	Basis for Depreciation as a Percent of Total Cost	Annual Depreciation	Annual Full Cost Depreciation (Current Depreciation/ Depreciation Basis)
<b>Vehicles</b>			
<u>Number</u>			
10	100	\$1,412	\$1,412
15	100	1,647	1,647
24	20	1,592	7,960
25	20	1,089	5,445
26	100	5,345	5,345
35-44	---	---	---
Subtotal Vehicles		\$11,085	\$21,809
<b>Radios</b>			
<u>Number</u>			
Base Radio	100	\$1,438	\$1,438
17	100	695	695
18	100	695	695
19	100	696	696
1	100	149	149
2	100	218	218
3	100	873	873
10	100	509	509
15	100	509	509
25	180	545	545
26	100	<u>546</u>	<u>546</u>
Subtotal Radios		\$6,873	\$6,873
<b>Miscellaneous</b>			
Bus Seats	100	\$249	\$249
Lift	100	<u>516</u>	<u>516</u>
Subtotal Miscellaneous		\$765	\$765
TOTALS		\$18,723	\$29,447

- 2b. **Modify depreciation accounts to include the full costs of capital assets: Modify Chart of Accounts.** The calculated full depreciation costs are entered in the overall chart of accounts (See Exhibit 10).

In addition, separate line item expense accounts for depreciation should be delineated by function within the overall chart of accounts. In this manner, the line item expense account **Vehicle Depreciation** should be replaced by the caption **Vehicle and Operations Depreciation**. Similarly, the line item expense account **Garage and Maintenance Depreciation** should be entered within the Maintenance accounts, the line item expense account **Non-Vehicle Maintenance Depreciation** should be entered within the Non-Vehicle Maintenance accounts and the line item expense account **Office and Administration Depreciation** should be entered within the Administration accounts (See Exhibit 10).

## Exhibit 10

Modification for Vehicle and Operations Depreciation  
URTA Example

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
VEHICLE OPERATIONS				
DRIVERS SALARIES	179,760			
DISPATCHERS SALARIES	28,047			
PSSNGR. AID SALARIES	1,477			
DRIVERS FRINGES	30,191			
DISPATCHERS FRINGES	4,387			
PASSENGER AID FRINGES	0			
FUEL OIL	43,872			
TUBES & TIRES	5,103			
VEHICLE INSURANCE	34,734			
VEHICLE LEASE	0			
VEHICLE and OPERATIONS DEPRECIATION	18,723	+10,724	29,447	Full Depreciation
VEH LICENSE, REG, TAX	175			
VEH STORAGE FAC RNTL	2,376			
OTHER	489			
MAINTENANCE				
MECHANICS SALARIES	11,088			
OTHER WAGES	20,256			
MECHANICS FRINGES	3,035			
OTHER FRINGES	4,069			
CASUALTY/LIABILITY	0			
MAINTENANCE SVC CONTR	0			
MATERIALS & SUPPLIES	10,788			
MAINT FACILITY RNTL	0			
EQUIPMENT RENTAL	0			
GARAGE and MAINTENANCE DEPRECIATION	0			
UTILITIES	0			
SERVICES	28,124			
OTHER	0			
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	0			
FRINGE BENEFITS	0			
SERVICES	0			
MATERIALS/SUPPLIES	0			
NON-VEHICLE MAINTENANCE DEPRECIATION	0			
OTHER	0			
ADMINISTRATION				
ADMINISTRATORS SALARY	34,524			
MANAGERS SALARY	18,672			
DISPATCHERS SALARY	0			
SECRETARYS SALARY	14,790			
BOOKKEEPERS SALARY	0			
OTHER SALARY	0			
ADMINISTRATORS FRINGES	4,738			
MANAGERS FRINGES	2,545			
DISPATCHERS FRINGES	0			
SECRETARYS FRINGES	2,062			
BOOKKEEPERS FRINGES	0			
OTHER FRINGES	0			
MATERIALS/SUPPLIES	9,336			
CASUALTY/LIABILITY	10,044			
FUEL SVC VEHICLE	0			
TAXES	0			
SERVICES	2,115			
PURCHASED TRANSP	67,380			
EXPENSE TRANSFERS	0			
INTEREST EXPENSE	0			
AMORT OF INTANGIBLES	0			
TELEPHONE	3,336			
OFFICE RENTAL	12,156			
OFFICE & ADMINISTRATION DEPRECIATION	0			
UTILITIES	0			
OFFICE EQPT RENTAL	3,513			
OTHER	921			
Totals	\$612,826			

3. **Adjust expense line items where shared costs are involved.** The costs of services shared within the agency (e.g., the executive director) may not be shown in the ledger sheet. However, these costs must be estimated and included in developing the baseline model.

For purposes of illustration, let it be assumed that the URTA is a multi-purpose agency where a portion of the executive director's salary is not included in the URTA revenue and expense statement. The portion of the executive director's salary attributable to the URTA can be estimated in several ways (e.g., on the basis of time spent in competing activities or on the basis of the number of employees in transportation versus other functions). Assume that the number of employees will be the basis for allocating the executive director's salary. Assume further that the 35 employees of the URTA represent one-half of the 70 employees of this multi-purpose agency. If the executive director's salary is \$50,000, then 50%, or \$25,000 can be allocated to transportation in proportion to the number of URTA employees. Therefore, the line item expense account **Administrators Salary** was increased by \$25,000 from \$34,524 to \$59,524 (See Exhibit 11). Correspondingly, the line item expense account **Administrators Fringe Benefits** was increased from \$4,738 to \$8,174, or by \$3,436.

**Exhibit 11**

**Modification for Shared Costs  
URTA Example**

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
<b>VEHICLE OPERATIONS</b>				
DRIVERS SALARIES	179,760			
DISPATCHERS SALARIES	28,047			
PSSNGR. AID SALARIES	1,477			
DRIVERS FRINGES	30,191			
DISPATCHERS FRINGES	4,387			
PASSENGER AID FRINGES	0			
FUEL OIL	43,872			
TUBES & TIRES	5,103			
VEHICLE INSURANCE	34,734			
VEHICLE LEASE	0			
VEHICLE & OPERATIONS DEPRECIATION	18,723	+10,724	29,447	Full Depreciation
VEH LICENSE, REG, TAX	175			
VEH STORAGE FAC RNTL	2,376			
OTHER	489			
<b>MAINTENANCE</b>				
MECHANICS SALARIES	11,088			
OTHER WAGES	20,256			
MECHANICS FRINGES	3,035			
OTHER FRINGES	4,069			
CASUALTY/LIABILITY	0			
MAINTENANCE SVC CONTR	0			
MATERIALS & SUPPLIES	10,788			
MAINT FACILITY RNTL	0			
EQUIPMENT RENTAL	0			
GARAGE & MAINTENANCE DEPRECIATION	0			
UTILITIES	0			
SERVICES	28,124			
OTHER	0			
<b>NON-VEHICLE MAINTENANCE</b>				
JANITORIAL WAGES	0			
FRINGE BENEFITS	0			
SERVICES	0			
MATERIALS/SUPPLIES	0			
NON-VEHICLE MAINTENANCE DEPRECIATION	0			
OTHER	0			
<b>ADMINISTRATION</b>				
ADMINISTRATORS SALARY	34,524	+25,000	59,524	Shared Cost
MANAGERS SALARY	18,672			
DISPATCHERS SALARY	0			
SECRETARYS SALARY	14,790			
BOOKKEEPERS SALARY	0			
OTHER SALARY	0			
ADMINISTRATORS FRINGES	4,738	+ 3,436	8,174	Shared Cost
MANAGERS FRINGES	2,545			
DISPATCHERS FRINGES	0			
SECRETARYS FRINGES	2,062			
BOOKKEEPERS FRINGES	0			
OTHER FRINGES	0			
MATERIALS/SUPPLIES	9,336			
CASUALTY/LIABILITY	10,044			
FUEL SVC VEHICLE	0			
TAXES	0			
SERVICES	2,115			
PURCHASED TRANSP	67,380			
EXPENSE TRANSFERS	0			
INTEREST EXPENSE	0			
AMORT OF INTANGIBLES	0			
TELEPHONE	3,336			
OFFICE RENTAL	12,156			
OFFICE & ADMINISTRATION DEPRECIATION	0			
UTILITIES	0			
OFFICE EQPT RENTAL	3,513			
OTHER	921			
Totals	\$612,826			

4. **Modify expense items to account for publicly-donated services or implicit costs.** The costs of services provided by other governmental agencies (e.g., legal and grounds maintenance services provided by a municipal government) may not be reflected in the revenue and expense statement unless they are included as part of the local jurisdiction local match. However, since these services are being supported by the taxpayer-at-large, their costs must be estimated and included in the calibration of the baseline model.

Let it be assumed that the URTA receives lubrication services from a local government and that these services are not reflected in the agency's revenue and expense statement. The market value of these services is estimated to be \$10,000. As a result, the line item expense account **Services (Maintenance)** was increased from \$28,124 to \$38,124 (See Exhibit 12).



## Exhibit 12

Modification for Publicly - Donated Services  
URTA Example

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
<b>VEHICLE OPERATIONS</b>				
DRIVERS SALARIES	179,760			
DISPATCHERS SALARIES	28,047			
PSSNGR. AID SALARIES	1,477			
DRIVERS FRINGES	30,191			
DISPATCHERS FRINGES	4,387			
PASSENGER AID FRINGES	0			
FUEL OIL	43,872			
TUBES & TIRES	5,103			
VEHICLE INSURANCE	34,734			
VEHICLE LEASE	0			
VEHICLE & OPERATIONS DEPRECIATION	18,723	+10,724	29,447	Full Depreciation
VEH LICENSE, REG, TAX	175			
VEH STORAGE FAC RNTL	2,376			
OTHER	489			
<b>MAINTENANCE</b>				
MECHANICS SALARIES	11,088			
OTHER WAGES	20,256			
MECHANICS FRINGES	3,035			
OTHER FRINGES	4,069			
CASUALTY/LIABILITY	0			
MAINTENANCE SVC CONTR	0			
MATERIALS & SUPPLIES	10,788			
MAINT FACILITY RNTL	0			
EQUIPMENT RENTAL	0			
GARAGE & MAINTENANCE DEPRECIATION	0			
UTILITIES	0			
SERVICES	28,124	+10,000	38,124	Publicly-Donated Service
OTHER	0			
<b>NON-VEHICLE MAINTENANCE</b>				
JANITORIAL WAGES	0			
FRINGE BENEFITS	0			
SERVICES	0			
MATERIALS/SUPPLIES	0			
NON-VEHICLE MAINTENANCE DEPRECIATION	0			
OTHER	0			
<b>ADMINISTRATION</b>				
ADMINISTRATORS SALARY	34,524	+25,000	59,524	Shared Cost
MANAGERS SALARY	18,672			
DISPATCHERS SALARY	0			
SECRETARYS SALARY	14,790			
BOOKKEEPERS SALARY	0			
OTHER SALARY	0			
ADMINISTRATORS FRINGES	4,738	+ 3,436	8,174	Shared Cost
MANAGERS FRINGES	2,545			
DISPATCHERS FRINGES	0			
SECRETARYS FRINGES	2,062			
BOOKKEEPERS FRINGES	0			
OTHER FRINGES	0			
MATERIALS/SUPPLIES	9,336			
CASUALTY/LIABILITY	10,044			
FUEL SVC VEHICLE	0			
TAXES	0			
SERVICES	2,115			
PURCHASED TRANSP	67,380			
EXPENSE TRANSFERS	0			
INTEREST EXPENSE	0			
AMORT OF INTANGIBLES	0			
TELEPHONE	3,336			
OFFICE RENTAL	12,156			
OFFICE & ADMINISTRATION DEPRECIATION	0			
UTILITIES	0			
OFFICE EQPT RENTAL	3,513			
OTHER	921			
Totals	\$612,826			

5. **Decrease expense items where privately-donated services are provided.** The costs associated with privately-donated services are permitted as eligible expenses in the operating statement that an agency prepares for the MTA. Nonetheless, for the purposes of cost comparison among public and private providers, privately-donated services are not considered as legitimate expenses since they are not borne by the general taxpayer. For this reason, the costs of privately-donated services must be excluded in developing the baseline model. (Note: This item must be deleted from the model for costing purposes only).

In this example, it is assumed that a local church group provides the URTA with volunteer passenger aids and that the URTA has included \$1,000 in the line item expense account **Passenger Aid Salaries** for these services. For purposes of model calibration, the line item expense account **Passenger Aid Salaries** was reduced from \$1,477 to \$477, or by \$1,000 (See Exhibit 13). A corresponding adjustment to the line item expense account **Passenger Aid Fringes** is not shown because this account has a zero entry.

## Exhibit 13

Modification for Privately - Donated Services  
URTA Example

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
VEHICLE OPERATIONS				
DRIVERS SALARIES	179,760		179,760	
DISPATCHERS SALARIES	28,047		28,047	
PSSNGR. AID SALARIES	1,477	- 1,000	477	Privately-Donated Services
DRIVERS FRINGES	30,191		30,191	
DISPATCHERS FRINGES	4,387		4,387	
PASSENGER AID FRINGES	0		0	
FUEL OIL	43,872		43,872	
TUBES & TIRES	5,103		5,103	
VEHICLE INSURANCE	34,734		34,734	
VEHICLE LEASE	0		0	
VEHICLE & OPERATIONS DEPRECIATION	18,723	+10,724	29,447	Full Depreciation
VEH LICENSE, REG, TAX	175		175	
VEH STORAGE FAC RNTL	2,376		2,376	
OTHER	489		489	
MAINTENANCE				
MECHANICS SALARIES	11,088		11,088	
OTHER WAGES	20,256		20,256	
MECHANICS FRINGES	3,035		3,035	
OTHER FRINGES	4,069		4,069	
CASUALTY/LIABILITY	0		0	
MAINTENANCE SVC CONTR	0		0	
MATERIALS & SUPPLIES	10,788		10,788	
MAINT FACILITY RNTL	0		0	
EQUIPMENT RENTAL	0		0	
GARAGE & MAINTENANCE DEPRECIATION	0		0	
UTILITIES	0		0	
SERVICES	28,124	+10,000	38,124	Publicly-Donated Service
OTHER	0		0	
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	0		0	
FRINGE BENEFITS	0		0	
SERVICES	0		0	
MATERIALS/SUPPLIES	0		0	
NON-VEHICLE MAINTENANCE DEPRECIATION	0		0	
OTHER	0		0	
ADMINISTRATION				
ADMINISTRATORS SALARY	34,524	+25,000	59,524	Shared Cost
MANAGERS SALARY	18,672		18,672	
DISPATCHERS SALARY	0		0	
SECRETARYS SALARY	14,790		14,790	
BOOKKEEPERS SALARY	0		0	
OTHER SALARY	0		0	
ADMINISTRATORS FRINGES	4,738	+ 3,436	8,174	Shared Cost
MANAGERS FRINGES	2,545		2,545	
DISPATCHERS FRINGES	0		0	
SECRETARYS FRINGES	2,062		2,062	
BOOKKEEPERS FRINGES	0		0	
OTHER FRINGES	0		0	
MATERIALS/SUPPLIES	9,336		9,336	
CASUALTY/LIABILITY	10,044		10,044	
FUEL SVC VEHICLE	0		0	
TAXES	0		0	
SERVICES	2,115		2,115	
PURCHASED TRANSP	67,380		67,380	
EXPENSE TRANSFERS	0		0	
INTEREST EXPENSE	0		0	
AMORT OF INTANGIBLES	0		0	
TELEPHONE	3,336		3,336	
OFFICE RENTAL	12,156		12,156	
OFFICE & ADMINISTRATION DEPRECIATION	0		0	
UTILITIES	0		0	
OFFICE EQPT RENTAL	3,513		3,513	
OTHER	921		921	
Totals	\$612,826	\$48,160	\$660,986	

**Step 2: Assign Line Item Expense Accounts**

The primary assumption of the three-variable, fully allocated cost model is that each line item expense can be logically linked to one of the three resource variables to be used: hours, miles or vehicles. To accomplish this task, it is necessary to know how and why expense items vary.

For example, the **number of miles** accounts for most of operator labor costs since driver expense is a function of the amount of time that vehicles are in operation. For this reason, line item expense accounts such as **Drivers Salaries** and **Drivers Fringes** were assigned to hours of operation (See Exhibit 14).

Further, the **number of miles** accounts for most maintenance labor and materials costs as well as fuel expenses. As a result, line item expense accounts such as **Mechanics Salaries**, **Mechanics Fringes**, **Materials & Supplies** and **Fuel Oil** were assigned to miles of operation (See Exhibit 14).

Finally, the **number of vehicles** in operation accounts for many of the items of overhead expense which do not vary with the number of miles or hours of operation but, instead, reflect the scale or size of the agency. Examples include administration, building rents and vehicle depreciation. For this reason, line item expense accounts such as **Administrators Salary**, **Managers Salary**, **Vehicle and Operations Depreciation**, and **Vehicle Storage Facility Rental** were assigned to vehicles in operation (See Exhibit 14).

There are no hard and steadfast rules for assigning expenses. For example, the line item expense (maintenance) accounts **Dispatchers Salaries** and **Other Wages (Maintenance)** could arguably be assigned to hours and miles of operation, respectively, since these expenditures reflect first-line supervision. In this example, these line item accounts were assigned to vehicles in service because they were assumed to relate to the overall scale of operations. In addition, the line item expense account **Purchased Transportation** could be pro-rated among all of the resource variables since this expenditure reflects "back-up" transportation. In this example, this line item expense account was linked to vehicles in operation because it was assumed to be related to the overall program operation.

Please note, however, that the assignment of expenses to hours, miles or vehicles should be logical (i.e., understood by all), defensible (i.e., pass scrutiny from an outside observer) and consistent (i.e., useful for watching cost trends over time). Other resource variables and methods can be used provided that they adhere to the objectives mentioned above.

## Exhibit 14

## MTA Chart of Accounts

## Basis for Expense Assignment

Expense Object Class	Hours	Miles	Vehicles
VEHICLE OPERATIONS			
DRIVERS SALARIES	X		
DISPATCHERS SALARIES			X
PSSNGR. AID SALARIES	X		
DRIVERS FRINGES	X		
DISPATCHERS FRINGES			X
PASSENGER AID FRINGES	X		
FUEL OIL		X	
TUBES & TIRES		X	
VEHICLE INSURANCE		X	
VEHICLE LEASE			X
VEHICLE & OPERATIONS DEPRECIATION			X
VEH LICENSE, REG, TAX			X
VEH STORAGE FAC RNTL			X
OTHER	X		
MAINTENANCE			
MECHANICS SALARIES		X	
OTHER WAGES			X
MECHANICS FRINGES		X	
OTHER FRINGES			X
CASUALTY/LIABILITY			X
MAINTENANCE SVC CONTR		X	
MATERIALS & SUPPLIES		X	
MAINT FACILITY RNTL			X
EQUIPMENT RENTAL			X
GARAGE & MAINTENANCE DEPRECIATION			X
UTILITIES			X
SERVICES		X	
OTHER		X	
NON-VEHICLE MAINTENANCE			
JANITORIAL WAGES			X
FRINGE BENEFITS			X
SERVICES			X
MATERIALS/SUPPLIES			X
NON-VEHICLE DEPRECIATION			X
OTHER			X
ADMINISTRATION			
ADMINISTRATORS SALARY			X
MANAGERS SALARY			X
DISPATCHERS SALARY			X
SECRETARYS SALARY			X
BOOKKEEPERS SALARY			X
OTHER SALARY			X
ADMINISTRATORS FRINGES			X
MANAGERS FRINGES			X
DISPATCHERS FRINGES			X
SECRETARYS FRINGES			X
BOOKKEEPERS FRINGES			X
OTHER FRINGES			X
MATERIALS/SUPPLIES			X
CASUALTY/LIABILITY			X
FUEL SVC VEHICLE			X
TAXES			X
SERVICES			X
PURCHASED TRANSP			X
EXPENSE TRANSFERS			X
INTEREST EXPENSE			X
AMORT OF INTANGIBLES			X
TELEPHONE			X
OFFICE RENTAL			X
OFFICE & ADMINISTRATION DEPRECIATION			X
UTILITIES			X
OFFICE EQPT RENTAL			X
OTHER			X

Once the assignment of line item expense accounts to resource variables is completed, the "Xs" are replaced by the actual expense values. The amounts assigned to each resource variable are then totalled.

In the URTA example, \$210,917 of expenses were assigned to hours of operation, \$146,744 of costs were logically linked to miles of operation and the remaining \$303,325 of expenses were assigned to vehicles in service (See Exhibit 15).

## Exhibit 15

## Expense Assignment

## URTA Example

Expense Object Class	Hours	Miles	Vehicles	Total
VEHICLE OPERATIONS				
DRIVERS SALARIES	179,760	0	0	179,760
DISPATCHERS SALARIES	0	0	28,047	28,047
PSSNGR. AID SALARIES	477	0	0	477
DRIVERS FRINGES	30,191	0	0	30,191
DISPATCHERS FRINGES	0	0	4,387	4,387
PASSENGER AID FRINGES	0	0	0	0
FUEL OIL	0	43,872	0	43,872
TUBES & TIRES	0	5,103	0	5,103
VEHICLE INSURANCE	0	34,734	0	34,734
VEHICLE LEASE	0	0	0	0
VEHICLE & OPERATIONS DEPRECIATION	0	0	29,447	29,447
VEH LICENSE, REG, TAX	0	0	175	175
VEH STORAGE FAC RNTL	0	0	2,376	2,376
OTHER	489	0	0	489
MAINTENANCE				
MECHANICS SALARIES	0	11,088	0	11,088
OTHER WAGES	0	0	20,256	20,256
MECHANICS FRINGES	0	3,035	0	3,035
OTHER FRINGES	0	0	4,069	4,069
CASUALTY/LIABILITY	0	0	0	0
MAINTENANCE SVC CONTR	0	0	0	0
MATERIALS & SUPPLIES	0	10,788	0	10,788
MAINT FACILITY RNTL	0	0	0	0
EQUIPMENT RENTAL	0	0	0	0
GARAGE & MAINTENANCE DEPRECIATION	0	0	0	0
UTILITIES	0	0	0	0
SERVICES	0	38,124	0	38,124
OTHER	0	0	0	0
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	0	0	0	0
FRINGE BENEFITS	0	0	0	0
SERVICES	0	0	0	0
MATERIALS/SUPPLIES	0	0	0	0
NON-VEHICLE DEPRECIATION	0	0	0	0
OTHER	0	0	0	0
ADMINISTRATION				
ADMINISTRATORS SALARY	0	0	59,524	59,524
MANAGERS SALARY	0	0	18,672	18,672
DISPATCHERS SALARY	0	0	0	0
SECRETARYS SALARY	0	0	14,790	14,790
BOOKKEEPERS SALARY	0	0	0	0
OTHER SALARY	0	0	0	0
ADMINISTRATORS FRINGES	0	0	8,174	8,174
MANAGERS FRINGES	0	0	2,545	2,545
DISPATCHERS FRINGES	0	0	0	0
SECRETARYS FRINGES	0	0	2,062	2,062
BOOKKEEPERS FRINGES	0	0	0	0
OTHER FRINGES	0	0	0	0
MATERIALS/SUPPLIES	0	0	9,336	9,336
CASUALTY/LIABILITY	0	0	10,044	10,044
FUEL SVC VEHICLE	0	0	0	0
TAXES	0	0	0	0
SERVICES	0	0	2,115	2,115
PURCHASED TRANSP	0	0	67,380	67,380
EXPENSE TRANSFERS	0	0	0	0
INTEREST EXPENSE	0	0	0	0
AMORT OF INTANGIBLES	0	0	0	0
TELEPHONE	0	0	3,336	3,336
OFFICE RENTAL	0	0	12,156	12,156
OFFICE & ADMINISTRATION DEPRECIATION	0	0	0	0
UTILITIES	0	0	0	0
OFFICE EQPT RENTAL	0	0	3,513	3,513
OTHER	0	0	921	921
Totals	\$210,917	\$146,744	\$303,325	\$660,986

**Step 3: Calculate Average Unit Costs**

Average unit costs are calculated by:

- (1) determining the value of each resource variable; and
- (2) dividing the resource cost by the resource value to obtain the average unit cost.

This process can be easily understood by referring to the URTA example (See Exhibit 16). Expenses assigned during this 12-month reporting period totalled \$660,986.

In satisfying step 1 from above, the value or quantity for each resource variable for the same reporting period is also shown as follows:

- 28,811 total annual hours (see page 12).
- 473,512 total annual miles (see page 12).
- 13 vehicles in service(see page 12).

In satisfying step 2 from above, average unit costs are computed by dividing the total amount of expenses assigned to a given resource variable by the value of that resource variable. For example, the \$7.32 cost per hour was derived by dividing the cost of \$210,917 assigned to hours by 28,811 hours.

The resultant three-variable, fully allocated cost model may then be presented as follows:

$$\text{Annual Total Cost} = (\$7.32 * H) + (\$0.31 * M) + (\$23,332.69 * V)$$

where:

H = annual hours of operation  
M = annual miles of operation  
V = vehicles in service



## Exhibit 16

### Average Unit Costs

#### URIA Expense Assignment

Basis of Assignment	Total Expenses Assigned (1)	Value of Resource Variable (2)	Average Unit Cost (3)=(1)/(2)
Hours	\$210,917	28,811	\$7.32
Miles	146,744	473,512	0.31
Vehicles	<u>303,325</u>	13	23,332.69
TOTALS	\$660,986		

$$\text{Annual Total Cost} = (\$7.32 * H) + (\$0.31 * M) + (\$23,332.69 * V)$$

where:

H = Annual hours of operation

M = Annual miles of operation

V = Vehicles in service

The three-variable, fully allocated cost model developed above includes both annual capital and operating costs. However, as mentioned before, the three-variable model is extremely flexible and can be utilized to analyze various categories of cost as needs dictate. For example, a "local cost" model could be developed for funding and reimbursement purposes by merely omitting the federal portion of the depreciation expense from the analysis (See Exhibit 17). Here, overall costs were reduced by the federally-funded depreciation charge of \$10,724. Since the line item expense account **Vehicle and Operations Depreciation** is assigned to vehicles in operation, the average unit cost per vehicle is the only cost coefficient impacted. As a result, the average unit cost per vehicle in service declines from \$23,332.69 under the original fully allocated approach to \$22,507.77 after making this adjustment.

It should be noted that further refinements could be made to the "local cost" model as required. For example, shared and implicit costs could be omitted from consideration should the need arise.

Exhibit 17

Average Unit Costs

URTA Expense Assignment

Local Cost Model

Basis of Assignment	Total Expenses Assigned	Value of Resource Variable	Average Unit Cost
Hours	\$210,917	28,811	\$7.32
Miles	146,744	473,512	0.31
Vehicles	<u>292,601</u> *	13	22,507.77
TOTALS	\$650,262		

Annual Total Cost = ( $\$7.32 * H$ ) + ( $\$0.31 * M$ ) + ( $\$22,507.77 * V$ )

\* 303,325 originally assigned to vehicles less \$10,724 in federally-funded depreciation expense.

One reason for using a cost allocation model is to distribute costs among funding sources or to individual routes or services. Identifying the costs of individual operations is invaluable for several reasons such as:

- o **performance monitoring** including the determination of key measures such as the revenue-to-cost ratio and overall deficit for each service; and
- o **cost reimbursement purposes** including determination of the fair share of cost attributable to different political entities or funding agencies for multi-jurisdictional or multi-purpose services.

Applying a fully allocated cost model to given service is straightforward and consists of two steps (See Exhibit 18):

- (1) Calculate the service specific values for each resource variable (i.e., the number of hours, miles and vehicles for each service); and
- (2) Calculate the cost estimate (i.e., use the fully allocated or local cost model in conjunction with the resource variable values mentioned above).

Each of these steps is described below for both the fully allocated and local cost models.

## Exhibit 18

### Three-Variable Model Application

1. Calculate Service-Specific Values for Each Resource Variable

A vertical arrow pointing downwards from the first box to the second box.

2. Calculate Fully Allocated Cost/Local Cost Estimate

**Step 1: Calculate Service-Specific Values for each Resource Variable**

The first step is to calculate the values of the resource variables for the service to be analyzed. These values should reflect the amount of service operated for the analysis period.

Assume that the URTA operates several services. Further assume that one such operation provided the following level of service during a recent 12-month period (See Exhibit 19):

- 2,100 hours
- 33,000 miles
- 1 vehicle

Note that maintaining information on the operating characteristics of each individual service of a multi-service agency is fundamental to measuring performance. As a result, this information should be collected by management if it is not already part of the agency's on-going data gathering activities.

**Exhibit 19**

**Fully Allocated Cost Model**

**Step 1: Calculate Service-Specific Values for  
Each Resource Variable**

**URTA Example**

<b>Resource Variable</b>	<b>Value of Resource Variable</b>
Hours	2,100
Miles	33,000
Vehicles	1

**Step 2: Calculate Fully Allocated Cost Estimate**

Calculation of the fully allocated cost estimate is comparatively simple. Each average unit cost factor was multiplied by the appropriate resource variable value in each case and then summed to obtain the cost estimate.

In the URTA case, the sample service cost an estimated \$48,935 during the last annual reporting period (See Exhibit 20).



**Exhibit 20**

**Fully Allocated Cost Model**

**Step 2: Calculate Fully Allocated Cost Estimate**

**URIA Example**

Resource Variable	Average Unit Cost	Value of Resource Variable	Total Cost
Hours	\$7.32	2,100	\$15,372
Miles	0.31	33,000	10,230
Vehicles	23,332.69	1	<u>23,333</u>
Total			\$48,935

**Step 1: Calculate Service-Specific Values for each Resource Variable (Local Cost Model: Example 1):**

As under the fully allocated approach, the first step is to calculate the values of the resource variables for the service to be analyzed.

Assume that the URTA operates two services with identical characteristics. During a recent 12-month period, each service consisted of the following (See Exhibit 21):

- 2,100 hours
- 33,000 miles
- 1 vehicle

Assume that one of these services was operated exclusively to the medical center. Assume that the other service operated to both the rehabilitation institute and the vocational counseling center. The issue here is to determine the cost of service to each of these centers.

**Exhibit 21**

**Local Cost Model: Example 1**

**Step 1: Calculate Service-Specific Values for  
Each Resource Variable**

**Medical Center or Rehabilitation Institute/  
Vocational Counseling Center Service**

<b>Resource Variable</b>	<b>Value of Resource Variable</b>
Hours	2,100
Miles	33,000
Vehicles	1

**Step 2: Calculate Local Cost Estimate (Local Cost Model: Example 1)**

Calculation of the local cost estimate is comparatively simple. Each average unit cost factor is multiplied by the appropriate resource variable value in each case and then summed to determine the cost estimate.

For example, the cost of providing service exclusively to the medical center was \$48,110 (See Exhibit 22). This cost estimate could be used for billing and funding reimbursement purposes.

## Exhibit 22

### Local Cost Model: Example 1

#### Step 2: Calculate Local Cost Estimate

#### Medical Center or Rehabilitation Institute/ Vocational Counseling Center Service

Resource Variable	Average Unit Cost	Value of Resource Variable	Total Cost
Hours	\$7.32	2,100	\$15,372
Miles	0.31	33,000	10,230
Vehicles	22,507.77	1	<u>22,508</u>
Total			\$48,110

The cost of providing service to multiple destinations, such as the rehabilitation institute and vocational counseling center, is less obvious. Clearly, a "cost sharing" mechanism must be devised to equitably allocate the costs of service. While a number of factors could be considered, perhaps the fairest and most straightforward way of distributing the costs to these two agencies is on the basis of passengers served.

In this example, passengers traveling to and from each center were tabulated during a recent 12-month period. Costs were then distributed in proportion to the ridership served to and from each facility. The total ridership on this service was 9,200. There were 4,000 passengers who traveled to the Rehabilitation Institute or 43.5% of the total ridership (4,000/9,200). The Vocational Counseling Center accounted for 5,200 passengers or 56.5% of the total ridership (5,200/9,200). As a result, of the overall cost of \$48,110, the rehabilitation institute could be charged \$20,928 while the vocational counseling center could be billed for the remaining \$27,182 (See Exhibit 23).

Exhibit 23

Local Cost Model: Example 1

Distribution of Multi-Agency Service Cost

Agency	Ridership	% of Total	Total Cost	Distributed Cost
Rehabilitation Institute	4,000	43.5	\$48,110	\$20,928
Vocational Counseling Ctr	<u>5,200</u>	<u>56.5</u>	48,110	<u>27,182</u>
Total	9,200	100.0		\$48,110

**Step 1: Calculate Service - Specific Values for Each Resource Variable (Local Cost Model: Example 2)**

As under the previous example, the first step is to calculate the values of the resource variables for the service or services to be analyzed.

Assume that the URTA operated two services with the following characteristics during a recent 12-month period (See Exhibit 24):

**Service A**

- 2,100 hours
- 33,000 miles
- 1 vehicle

**Service B**

- 26,711 hours
- 440,512 miles
- 12 vehicles

Taken together, these two services comprise the total system.

Assume that each of these services is supported by several funding sources. The issue here is to determine the cost of service that should be provided by each funding source.



**Exhibit 24:**

**Local Cost Model: Example 2**

**Step 1: Calculate Service - Specific Values  
for each Resource Variable**

<b>Resource Variable</b>	<b>Service A</b>	<b>Service B</b>	<b>Total</b>
Hours	2,100	26,711	28,811
Miles	33,000	440,512	473,512
Vehicles	1	12	13

**Step 2: Calculate Local Cost Estimate (Local Cost Model: Example 2)**

Calculation of the local cost estimate of each service is comparatively simple. As before, each average unit cost factor is multiplied by the appropriate resource variable value in each case and then summed to determine the cost estimate.

Thus, the cost of providing Service A is estimated to be \$48,110 while the cost of providing Service B is calculated to be \$602,177 (See Exhibit 25).

Exhibit 25

Local Cost Model: Example 2

Step 2: Calculate Local Cost Estimate

Resource Variable	Average Unit Cost	Value of <u>Resource Variable</u>		<u>Total Cost</u>	
		Service A	Service B	Service A	Service B
Hours	\$7.32	2,100	26,711	\$15,372	\$195,525
Miles	0.31	33,000	440,512	10,230	136,559
Vehicles	22,507.77	1	12	<u>22,508</u>	<u>270,093</u>
TOTAL				\$48,110 *	\$602,177 *

\*  
Numbers may not be identical to totals shown in Exhibit 17 due to the average unit cost factors.

The cost allocation model, in conjunction with ridership statistics, can also be used to provide an estimate of the support required from each funding source to sustain operations.

In this example, passengers traveling on each service were tabulated during a recent 12-month period. In addition, passengers were categorized by funding source. Costs were then distributed in proportion to the ridership served by funding source. Thus, the total ridership on Service A was 11,100. Of that total, 8,400 or 75.7% ( $8,400/11,100$ ), were assigned to Funding Source 1 while the balance of 2,700, or 24.3% ( $2,700/11,100$ ), were assigned to Funding Source 2. As a result, Funding Source 1 should be charged \$36,419 of the overall cost of \$48,110 while Funding Source 2 should be assessed the remaining \$11,691 (See Exhibit 26). Likewise, the total ridership on Service B was 124,800. Of that total, 92,400 or 74.0% ( $92,400/124,800$ ), were assigned to Funding Source 1 while the balance of 32,400, or 26.0% ( $32,400/124,800$ ), were assigned to Funding Source 2. Consequently, Funding Source 1 should be charged \$445,611 of the total cost of \$602,177 while Funding Source 2 should be assessed the remaining \$156,566 (See Exhibit 26).

In summary, Funding Source 1 should be billed \$482,030 while Funding source 2 should be charged \$116,257 (See Exhibit 26).

Exhibit 26

Local Cost Model: Example 2

Distribution of Multi-Funding Service Cost

Service	Ridership by Funding Source			Percentage			Total Cost	Distributed Cost	
	1	2	Total	1	2	Total		1	2
A	8,400	2,700	11,100	75.7	24.3	100.0	\$ 48,110	\$ 36,419	\$ 11,691
B	92,400	32,400	124,800	74.0	26.0	100.0	602,177	<u>445,611</u>	<u>156,566</u>
TOTAL								\$482,030	\$168,257



This chapter presents the required modifications to the basic fully allocated cost allocation model so that it can be used to provide defensible and accurate cost estimates consistent with federal guidelines (e.g., the UMTA Private Enterprise Policy). As such, three principal topics are covered in this chapter:

- o UMTA Private Enterprise Policy overview;
- o Non-operational cost adjustments; and
- o Bid specification cost adjustments.

### **UMTA Private Enterprise Policy Overview**

In the last chapter, it was mentioned that one of the principal reasons for using a fully allocated cost model is to determine the costs of individual services operated by a local jurisdiction or non-profit agency. Another reason for using a fully allocated cost model is to comply with UMTA's Private Enterprise Policy.

This policy states in part:

. . . when comparing the service proposals made by public and private entities, all of the fully allocated costs of public and non-profit agencies should be counted. (1)

While the previously developed baseline model is a good starting point for complying with the policy on competitive bidding, the model must be modified to reflect the functions that will be retained by the agency versus those activities that will be contracted-out. In this manner, the model can provide a cost estimate that is comparable to the bids submitted by the private sector.

(1) Federal Register, Volume 49, No. 205 and Federal Register, Volume 51, No. 16

It is important to note that some transportation functions cannot be contracted-out even in cases where organizations are ambitiously pursuing the privatization option. These functions are primarily administrative and include the policy-oriented activities of management (e.g., interacting with the governing board) and the non-attributable costs associated with a specific service to be contracted-out (e.g., grants preparation). These activities must be retained by the agency regardless of who is selected to operate the service. Consequently, the costs of these "involuntarily retained" activities should be identified, and not included in the cost analysis.

Adjusting the model to account for these "involuntarily retained" activities or non-operational costs consists of three-steps (See Exhibit 27):

- (1) Identify non-operational costs;
- (2) Modify cost numbers as required to reflect these non-operational costs; and
- (3) Develop and apply the modified fully allocated cost model to prepare the cost estimate.

Each of these steps is described below.



## **Exhibit 27**

### **Non-Operational Cost Adjustments**

**1. Identify Non-Operational Costs**

```
graph TD; A[1. Identify Non-Operational Costs] --> B[2. Modify Cost Numbers to Reflect These Non-Operational Costs]; B --> C[3. Develop and Apply the Modified Cost Model to Prepare the Cost Estimate];
```

**2. Modify Cost Numbers to Reflect These Non-Operational Costs**

**3. Develop and Apply the Modified Cost Model to Prepare the Cost Estimate**

**Step 1: Identify Non-Operational Costs**

The identification of non-operational costs begins with a general review of the line item expense accounts concerned with the administration of service. In most cases, only a portion of the expenses in a given account can be categorized as non-operational. Although other bases can be used, the amount of non-operational expense is usually based on the proportion of time that administrative employees spend on non-operational as opposed to operational matters. For example, an estimate of the proportion of time that the executive director of an agency spends on non-operational issues may be used to calculate the portion of his salary that should be excluded from the cost analysis.

For this example, estimates were made of the time spent by the URTA administrative staff on non-operational and operational matters (See Exhibit 28). As shown, non-operational costs amounted to \$90,330 of the \$105,767 included in these line item expense accounts.

The non-operational costs are still transportation expenses but, as described, are not directly used to operate transportation.

**Exhibit 28**

**Non-Operation Cost Adjustments to the Baseline Model**

**URTA Administrative Salary/Fringe Adjustments**

Line Item Expense Account	Percent Time Operations	Total Expense	Operational Expense	Non-Operational Expense
Administrator Salary	20	\$ 59,524	\$11,905	\$47,619
Manager Salary (1)	1	18,672	187	18,485
Secretary Salary	10	14,790	1,479	13,311
Administrator Fringes	20	8,174	1,635	6,539
Manager Fringes	1	2,545	25	2,520
Secretary Fringes	10	<u>2,062</u>	<u>206</u>	<u>1,856</u>
		\$105,767	\$15,437	\$90,330

(1) The salary of the URTA finance director (i.e., manager) is shown here.

Time estimates can also be used to modify other administrative expenses. Thus, the operational component of the line item expense account **Office Rental** can be calculated by considering the time and space utilized by staff involved in operational functions.

For example, drivers are assumed to spend 100% of their time in operations. Since the drivers' room is assumed to occupy 20% of the total office space leased, 20% of URTA's office space ( $100\% \times 20\%$ ) is assumed to be devoted to operations (See Exhibit 29). A similar exercise was conducted for other employees who utilize space in the URTA facility.

Overall, approximately 60% of the URTA office space is assumed to be used for operational activities. Likewise, it follows that 60%, or \$7,294, of the line item expense account **Office Rental** should be included in the cost analysis. The remaining 40% of this account value, or \$4,862, would be excluded from the baseline model. This method can also be employed to modify other line item expense accounts such as **Telephone** and **Office Equipment Rental**.

Exhibit 29

Non-Operational Cost Adjustments to the Baseline Model

URTA Office Rental Adjustments

Employee Category	Percent Time Operations	Percent Total Office Space	Operations Percent Total Office Space
Drivers	100	20	20
Dispatcher	100	25	25
Road Supervisor	100	10	10
Administrator	20	20	4
Manager	1	15	0
Secretaries	10	10	<u>1</u>
Total			60

Office Rental:

$$\begin{aligned}\text{Operational Expense} &= \text{Operational Rental Expense} * \\ &\quad \text{Operations Percent Total Office Space} \\ &= \$12,156 * 60\% \\ &= \$ 7,294 \\ \text{Non-Operational Expense} &= \$12,156 - \$7,294 \\ &= \$ 4,862\end{aligned}$$

**Step 2: Modify Cost Numbers to Reflect These Non-Operational Costs**

The non-operational cost adjustments described above were incorporated into the URTA chart of accounts as indicated below (See Exhibit 30):

- o Non-operational administrative staff costs of \$90,330 were excluded from the cost analysis (See Exhibit 30); and
- o Other non-operational administrative expenses of \$22,717 were excluded from the cost analysis (See Exhibit 30).

Overall, \$113,047 in non-operational cost adjustments were excluded from the baseline cost values thus, attesting to the importance of making these modifications.

**Exhibit 30**

**Non-Operational Cost Adjustments to the Baseline Model**

**URTA Expense Assignment**

<b>Expense Object Class</b>	<b>Hours</b>	<b>Miles</b>	<b>Vehicles</b>	<b>Change</b>
<b>VEHICLE OPERATIONS</b>				
DRIVERS SALARIES	179,760	0	0	
DISPATCHERS SALARIES	0	0	28,047	
PSSNGR. AID SALARIES	477	0	0	
DRIVERS FRINGES	30,191	0	0	
DISPATCHERS FRINGES	0	0	4,387	
PASSENGER AID FRINGES	0	0	0	
FUEL OIL	0	43,872	0	
TUBES & TIRES	0	5,103	0	
VEHICLE INSURANCE	0	34,734	0	
VEHICLE LEASE	0	0	0	
VEHICLE & OPERATIONAL DEPRECIATION	0	0	29,447	
VEN LICENSE,REG,TAX	0	0	175	
VEN STORAGE FAC RNTL	0	0	2,376	
OTHER	489	0	0	
<b>MAINTENANCE</b>				
MECHANICS SALARIES	0	11,088	0	
OTHER WAGES	0	0	20,256	
MECHANICS FRINGES	0	3,035	0	
OTHER FRINGES	0	0	4,069	
CASUALTY/LIABILITY	0	0	0	
MAINTENANCE SVC CONTR	0	0	0	
MATERIALS & SUPPLIES	0	10,788	0	
MAINT FACILITY RNTL	0	0	0	
EQUIPMENT RENTAL	0	0	0	
GARAGE & MAINTENANCE DEPRECIATION	0	0	0	
UTILITIES	0	0	0	
SERVICES	0	38,124	0	
OTHER	0	0	0	
<b>NON-VEHICLE MAINTENANCE</b>				
JANITORIAL WAGES	0	0	0	
FRINGE BENEFITS	0	0	0	
SERVICES	0	0	0	
MATERIALS/SUPPLIES	0	0	0	
NON VEHICLE MAINTENANCE DEPRECIATION	0	0	0	
OTHER	0	0	0	
<b>ADMINISTRATION</b>				
ADMINISTRATORS SALARY	0	0	11,905	-47,619
MANAGERS SALARY	0	0	187	-18,485
DISPATCHERS SALARY	0	0	0	
SECRETARYS SALARY	0	0	1,479	-13,311
BOOKKEEPERS SALARY	0	0	0	
OTHER SALARY	0	0	0	
ADMINISTRATORS FRINGES	0	0	1,635	-6,539
MANAGERS FRINGES	0	0	25	-2,520
DISPATCHERS FRINGES	0	0	0	
SECRETARYS FRINGES	0	0	206	-1,856
BOOKKEEPERS FRINGES	0	0	0	
OTHER FRINGES	0	0	0	
MATERIALS/SUPPLIES	0	0	1,400	-7,936
CASUALTY/LIABILITY	0	0	6,026	-4,018
FUEL SVC VEHICLE	0	0	0	
TAXES	0	0	0	
SERVICES	0	0	317	-1,798
PURCHASED TRANSP	0	0	67,380	
EXPENSE TRANSFERS	0	0	0	
INTEREST EXPENSE	0	0	0	
AMORT OF INTANGIBLES	0	0	0	
TELEPHONE	0	0	3,002	-334
OFFICE RENTAL	0	0	7,294	-4,862
OFFICE & ADMINISTRATION DEPRECIATION	0	0	0	
UTILITIES	0	0	0	
OFFICE EQPT RENTAL	0	0	527	-2,986
OTHER	0	0	138	-783
<b>Totals</b>	<b>\$210,917</b>	<b>\$146,744</b>	<b>\$190,278</b>	<b>-\$113,047</b>

**Step 3: Develop and Apply the Modified Cost Model to Prepare Cost Estimate**

The average unit costs for the modified cost model are calculated as before by dividing the assigned cost for each resource variable by the value of the resource variable. Since the non-operational functions are primarily administrative, the exclusion of non-operational expenses from the cost analysis affects the average unit cost per vehicle because administrative costs are assigned to vehicles in service.

In the URTA example, all of the non-operational modifications are made to line item expense accounts that are linked to vehicles in service. As a result of these changes, overall costs now total \$547,939 (as compared with \$660,986 previously) and the average unit cost per vehicle now equals \$14,636.77 (as compared with \$23,332.69 previously) (See Exhibit 31).



Exhibit 31

Non-Operational Cost Adjustments to the Baseline Model

URTA Calculation of Average Unit Costs

Basis of Assignment	Total Expenses Assigned	Value of Resource Variable	Average Unit Cost
Hours	\$210,917	28,811	\$7.32
Miles	146,744	473,512	0.31
Vehicles	<u>190,278</u>	13	14,636.77
TOTAL	\$547,939		

The exclusion of non-operational costs reduces the amount of total expenses assigned as well as the values of some average unit costs, typically the value of the average unit cost per vehicle. The impacts of these non-operational cost adjustments on the URTA baseline model were as follows (See Exhibit 32):

- o Overall costs decline from \$660,986 to \$547,939; and
- o The average unit cost per vehicle decreases from \$23,332.69 to \$14,636.77.

## Exhibit 32

### Impact of Non-Operational Cost Adjustments

#### URTA Example

	Total Expenses Assigned	Average Unit Cost		
		Hours	Miles	Vehicles
Baseline Model	\$660,986	\$7.32	\$0.31	\$23,332.69
After Non-Operational Cost Adjustments	547,939	7.32	0.31	14,636.77

By making the non-operational cost adjustments, the estimated costs of services are reduced. Once again, the average unit cost factors are multiplied by the applicable resource variables to obtain the cost estimate.

As a result, the estimated annual cost of the URTA sample service is \$40,239 after excluding non-operational activities from the cost analysis (See Exhibit 33).

**Exhibit 33**

**Non-Operational Cost Adjustments to the Baseline Model**

**URTA Cost of Sample Service**

<b>Resource Variable</b>	<b>Average Unit Cost</b>	<b>Value of Resource Variable</b>	<b>Total Cost</b>
Hours	\$7.32	2,100	\$15,372
Miles	0.31	33,000	10,230
Vehicles	14,636.77	1	<u>14,637</u>
<b>TOTAL</b>			<b>\$40,239</b>

Removal of non-operational functions from the analysis reduces the cost estimate of the URTA sample service by about \$8,696 to \$40,239 from the original calculation of \$48,935 (See Exhibit 34).

## **Exhibit 34**

### **Comparison of Cost Estimates**

#### **URTA Sample Service**

	<b>Estimated Cost</b>	<b>Change from Prior Line</b>
<b>Baseline Model</b>	<b>\$48,935</b>	<b>----</b>
<b>After Non-Operational Cost Adjustments</b>	<b>40,239</b>	<b>(\$8,696)</b>

In many contracting situations, the public agency may decide to continue to perform some functions (e.g., maintenance, marketing or perhaps provide vehicle capital) consistent with the bid specifications for the proposed service that is to be contracted-out. For this reason, the costs of these "voluntarily retained" activities should not be included in the cost analysis.

Adjusting the cost model to account for these "voluntarily retained" activities consists of three-steps (See Exhibit 35):

- (1) Identify what is to be contracted-out and what is to be retained;
- (2) Modify cost numbers as required to reflect what is to be contracted-out and retained; and
- (3) Develop and apply the modified fully allocated cost model to prepare the cost estimate.

While this three-step process resembles the procedure mentioned above for non-operational costs, there is an important difference. Non-operational costs, on the one hand, remain constant regardless of the bid specifications for a proposed service that is to be contracted-out. On the other hand, the activities that an agency decides to contract-out are more fluid -- that is, they can vary with each competitive bidding situation.

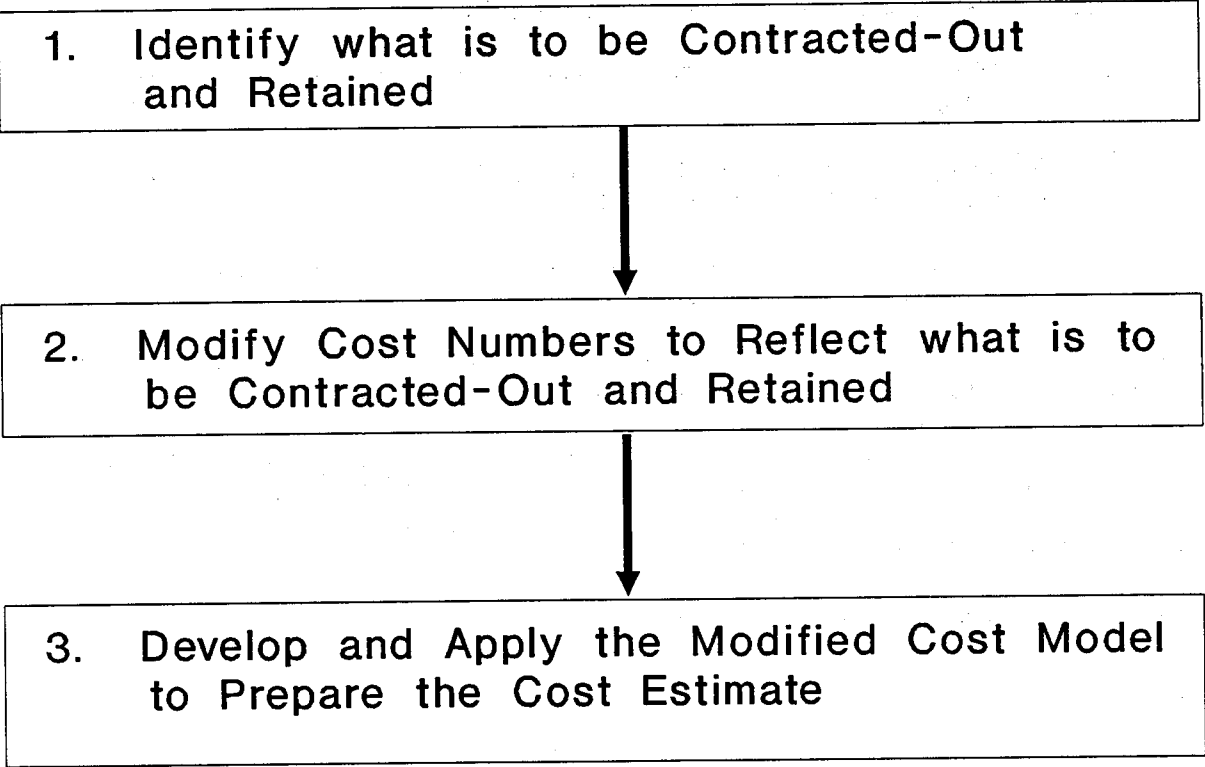
Each of these steps is described below.



## **Exhibit 35**

### **Bid Specification Costs Adjustments**

**1. Identify what is to be Contracted-Out and Retained**



```
graph TD; A[1. Identify what is to be Contracted-Out and Retained] --> B[2. Modify Cost Numbers to Reflect what is to be Contracted-Out and Retained]; B --> C[3. Develop and Apply the Modified Cost Model to Prepare the Cost Estimate];
```

**2. Modify Cost Numbers to Reflect what is to be Contracted-Out and Retained**

**3. Develop and Apply the Modified Cost Model to Prepare the Cost Estimate**

**Step 1: Identify What is to be Contracted-out and Retained**

A careful examination of each line item expense account is required to determine if the item is to be contracted-out in conformance with a given bid specification. Line item expense accounts to be contracted-out are included in the cost analysis. Other line item expense accounts - - those that are "voluntarily retained" by the agency - - are deleted from the cost analysis.

Assume that the URTA wishes to contract-out all vehicle operations and maintenance activities for the sample service under consideration. In addition, assume that the URTA has decided to provide vehicle capital to the successful bidder as a "voluntarily retained" function. Finally, all administrative functions which are operational in nature are assumed to be implicitly contracted-out as well (i.e., a portion of bookkeeping expense, personnel, etc.). On this basis, there are only three line item expense accounts that are excluded from the modified baseline model (See Exhibit 36). These line item expense accounts are Tubes & Tires, Vehicle and Operations Depreciation and Vehicle License, Reg., Tax.

**Exhibit 36**

**Bid Specification Cost Adjustments to the Baseline Model**

**URTA Retained Activities**

<b>Line Item Expense Accounts</b>	<b>Expense</b>
<b>Tubes &amp; Tires</b>	<b>\$ 5,103</b>
<b>Vehicle &amp; Operations Depreciation</b>	<b>29,447</b>
<b>Vehicle License, Reg., Tax</b>	<b>175</b>

**Step 2: Modify Cost Numbers to Reflect What is to be Contracted-Out and Retained**

The bid specification cost adjustments described above were incorporated into the chart of accounts. As shown, expenses totaling \$34,725 were excluded from the URTA baseline model consistent with the bid specifications and the agency's decision to retain these functions. (See Exhibit 37).

## Exhibit 37

## Bid Specification Cost Adjustments to the Baseline Model

## URTA Example

Expense Object Class	Hours	Miles	Vehicles	Change
VEHICLE OPERATIONS				
DRIVERS SALARIES	179,760	0	0	
DISPATCHERS SALARIES	0	0	28,047	
PSSNGR. AID SALARIES	477	0	0	
DRIVERS FRINGES	30,191	0	0	
DISPATCHERS FRINGES	0	0	4,387	
PASSENGER AID FRINGES	0	0	0	
FUEL OIL	0	43,872	0	
TUBES & TIRES	0	0	0	-5,103
VEHICLE INSURANCE	0	34,734	0	
VEHICLE LEASE	0	0	0	
VEHICLE & OPERATIONS DEPRECIATION	0	0	0	-29,447
VEH LICENSE, REG, TAX	0	0	0	-175
VEH STORAGE FAC RNTL	0	0	2,376	
OTHER	489	0	0	
MAINTENANCE				
MECHANICS SALARIES	0	11,088	0	
OTHER WAGES	0	0	20,256	
MECHANICS FRINGES	0	3,035	0	
OTHER FRINGES	0	0	4,069	
CASUALTY/LIABILITY	0	0	0	
MAINTENANCE SVC CONTR	0	0	0	
MATERIALS & SUPPLIES	0	10,788	0	
MAINT FACILITY RNTL	0	0	0	
EQUIPMENT RENTAL	0	0	0	
GARAGE & MAINTENANCE DEPRECIATION	0	0	0	
UTILITIES	0	0	0	
SERVICES	0	38,124	0	
OTHER	0	0	0	
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	0	0	0	
FRINGE BENEFITS	0	0	0	
SERVICES	0	0	0	
MATERIALS/SUPPLIES	0	0	0	
NON-VEHICLE MAINTENANCE	0	0	0	
OTHER	0	0	0	
ADMINISTRATION				
ADMINISTRATORS SALARY	0	0	11,905	
MANAGERS SALARY	0	0	187	
DISPATCHERS SALARY	0	0	0	
SECRETARYS SALARY	0	0	1,479	
BOOKKEEPERS SALARY	0	0	0	
OTHER SALARY	0	0	0	
ADMINISTRATORS FRINGES	0	0	1,635	
MANAGERS FRINGES	0	0	25	
DISPATCHERS FRINGES	0	0	0	
SECRETARYS FRINGES	0	0	206	
BOOKKEEPERS FRINGES	0	0	0	
OTHER FRINGES	0	0	0	
MATERIALS/SUPPLIES	0	0	1,400	
CASUALTY/LIABILITY	0	0	6,026	
FUEL SVC VEHICLE	0	0	0	
TAXES	0	0	0	
SERVICES	0	0	317	
PURCHASED TRANSP	0	0	67,380	
EXPENSE TRANSFERS	0	0	0	
INTEREST EXPENSE	0	0	0	
AMORT OF INTANGIBLES	0	0	0	
TELEPHONE	0	0	3,002	
OFFICE RENTAL	0	0	7,294	
OFFICE & ADMINISTRATION DEPRECIATION	0	0	0	
UTILITIES	0	0	0	
OFFICE EQPT RENTAL	0	0	527	
OTHER	0	0	138	
Totals	\$141,641	\$210,917	\$160,656	\$ 34,725

**Step 3: Develop and Apply the Modified Cost Model to Prepare Cost Estimate**

The average unit costs for the modified cost model are calculated as before by dividing the assigned cost for each variable by the value of the resource variable. Generally, the values of one or more of the average unit costs are reduced.

Since the "voluntarily retained" functions principally involve vehicle capital in the URTA example, the deletion of these activities from the cost analysis affects the average unit cost per vehicle because the line item expense accounts **Vehicle and Operations Depreciation, Vehicle License, Reg., Tax** are assigned to vehicles in service. In addition, there is a minor impact to the average unit cost per mile because the line item expense account **Tubes & Tires** is linked to miles of operation. As a result of these changes, overall costs now total \$513,214 and the average unit cost per vehicle and per mile now equal \$12,358.15 and \$0.30, respectively (See Exhibit 38).

**Exhibit 38**

**Bid Specification Cost Adjustments to the Baseline Model**

**URTA Calculation of Average Unit Costs**

<b>Basis of Assignment</b>	<b>Total Expenses Assigned</b>	<b>Value of Resource Variable</b>	<b>Average Unit Cost</b>
Hours	\$210,917	28,811	\$7.32
Miles	141,641	473,512	0.30
Vehicles	<u>160,656</u>	13	12,358.15
TOTALS	\$513,214		

Excluding the costs of the "voluntarily retained" functions reduces the total expenses assigned and the values of the affected average unit costs. The impact of these bid specification cost adjustments on the URTA baseline model were as follows (See Exhibit 39):

- o Overall costs decline from \$660,986 initially to \$547,939 after making the non-operational cost adjustments while costs further decrease to \$513,214 after making the bid specification cost adjustments;
- o The average unit cost per hour remains unchanged during the analysis since no adjustments were made that affect the hourly costs;
- o The average unit cost per mile declines from \$0.31 initially to \$0.30 after making the bid specification cost adjustments; and
- o The average unit cost per vehicle decreases from \$23,332.69 initially to \$14,636.77 owing to the non-operational cost adjustments while the ratio further declines to \$12,358.15 as a result of the bid specification cost adjustments.



### Exhibit 39

#### Impact of Bid Specification Cost Adjustments

##### URTA Example

Total Expenses	Assigned	Average Unit Cost		
		Hours	Miles	Vehicles
Baseline Model	\$660,986	\$7.32	\$0.31	\$23,332.69
After Non-Operational Cost Adjustments	547,939	7.32	0.31	14,636.77
After Bid Specification Cost Adjustments	513,214	7.32	0.30	12,358.15

By making the cost adjustments for the "voluntarily retained" functions, the estimated costs of services are further reduced.

Further adjustments to the average unit cost per vehicle and modification to the average unit cost per mile are also reflected in the cost of the URTA sample service. The estimated annual cost of the sample service is \$37,630 after excluding the bid specifications from the cost analysis (See Exhibit 40).

**Exhibit 40**

**Bid Specification Cost Adjustments to the Baseline Model**

**URTA Cost of Sample Service**

<b>Resource Variable</b>	<b>Average Unit Cost</b>	<b>Value of Resource Variable</b>	<b>Total Cost</b>
Hours	\$7.32	2,100	\$15,372
Miles	0.30	33,000	9,900
Vehicles	12,358.15	1	<u>12,358</u>
Total			\$37,630

Removal of the functions that are to be retained by URTA reduces the cost estimate of the sample service by an additional \$2,609 to \$37,630 from the original calculation of \$48,935 (See Exhibit 41).

**Exhibit 41**

**Comparison of Cost Estimates**

**URTA Sample Service**

	<b>Estimated Cost</b>	<b>Change from Prior Line</b>
Baseline Model	\$48,935	----
After Non-Operational Cost Adjustments	40,239	(\$8,696)
After Bid Specification Cost Adjustments	37,630	(\$2,609)



This chapter focuses on developing cost models for future years. In this manner, inflation and other anticipated changes are taken into account in adjusting agency expenses for an upcoming period such as a contract term covered in a competitive bidding situation. Three principal topics are covered in this chapter including the following:

- o Operating cost adjustments;
- o Capital cost adjustments; and
- o Future year model development.

A fully allocated cost model is usually developed from historical data. In this manner, actual costs incurred during a given reporting period can be compared to the actual outputs of the system (i.e., the number of hours, miles and vehicles) during the same time period. However, when an agency prepares a cost proposal, it is usually for an upcoming time period. For this reason, historical cost numbers need to be adjusted to reflect future year conditions.

Most likely, operating costs will need to be escalated to account for the impact of inflation or known price increases. Capital costs, mainly equipment depreciation charges, need to be escalated to reflect the anticipated replacement or expansion of current assets.

Resource variables (i.e., the number of hours, miles and vehicles) may also need to be projected forward where changes in service are forecast to occur. The cost impacts associated with any changes in these factors need to be considered.

For the sake of simplicity, let it be assumed that the URTA is planning no change in service levels during an upcoming contract period. For this reason, attention will be devoted to the operating and capital cost adjustments that could occur during this assumed contract period.

Preparing adjustments in operating costs consists of three-steps as described below (See Exhibit 42):

- (1) Identify operating cost line item expense accounts;
- (2) Identify cost escalation factors; and
- (3) Calculate estimated annual costs.

Each of these steps is described below.

**Step 1: Identify Operating Cost Line Item Expense Accounts**

The first step is relatively simple -- identify the cost elements which are operating costs. All of the line item expense accounts included in the MTA chart of accounts are operating expenses with the exception of the line item expense accounts concerned with depreciation.



## Exhibit 42

### Operating Cost Adjustments

1. Identify Operating Cost Line Item Expense Accounts.



2. Identify Cost Escalation Factors.



3. Calculate Estimated Annual Costs.

**Step 2: Identify Cost Escalation Factors**

Cost escalation factors may be derived from three sources:

- (1) existing contracts (e.g., labor and vendor agreements);
- (2) historical experience (e.g., trend-line analysis); and
- (3) "educated estimate" or "expert opinion."

Cost escalation factors were developed for each operating expense for the URTA during a hypothetical, two-year contract period (See Exhibit 43). For example, it is assumed that driver salaries would increase each year by 4%, hence, the factor 1.04 was used in each year of the contract period. (See Exhibit 43). These factors assume consistent increases in costs during the contract term. However, in cases where source information suggests otherwise (e.g. a labor agreement calling for a differential wage increase during the contract term), year-to-year variation in cost escalation factors can be expected.

Exhibit 43

Operating Cost Escalation Factors

URTA Example

Expense Object Class	Year 1	Year 2
<b>VEHICLE OPERATIONS</b>		
DRIVERS SALARIES	1.04	1.04
DISPATCHERS SALARIES	1.04	1.04
PSSNGR. AID SALARIES	1.04	1.04
DRIVERS FRINGES	1.04	1.04
DISPATCHERS FRINGES	1.04	1.04
PASSENGER AID FRINGES	-	-
FUEL OIL	1.02	1.02
TUBES & TIRES	-	-
VEHICLE INSURANCE	1.08	1.08
VEHICLE LEASE	-	-
VEH LICENSE,REG,TAX	-	-
VEH STORAGE FAC RNTL	1.04	1.04
OTHER	1.04	1.04
<b>MAINTENANCE</b>		
MECHANICS SALARIES	1.04	1.04
OTHER WAGES	1.04	1.04
MECHANICS FRINGES	1.04	1.04
OTHER FRINGES	1.04	1.04
CASUALTY/LIABILITY	-	-
MAINTENANCE SVC CONTR	-	-
MATERIALS & SUPPLIES	1.02	1.02
MAINT FACILITY RNTL	-	-
EQUIPMENT RENTAL	-	-
UTILITIES	-	-
SERVICES	1.04	1.04
OTHER	-	-
<b>NON-VEHICLE MAINTENANCE</b>		
JANITORIAL WAGES	-	-
FRINGE BENEFITS	-	-
SERVICES	-	-
MATERIALS/SUPPLIES	-	-
OTHER	-	-
<b>ADMINISTRATION</b>		
ADMINISTRATORS SALARY	1.04	1.04
MANAGERS SALARY	1.04	1.04
DISPATCHERS SALARY	-	-
SECRETARYS SALARY	1.04	1.04
BOOKKEEPERS SALARY	-	-
OTHER SALARY	-	-
ADMINISTRATORS FRINGES	1.04	1.04
MANAGERS FRINGES	1.04	1.04
DISPATCHERS FRINGES	-	-
SECRETARYS FRINGES	1.04	1.04
BOOKKEEPERS FRINGES	-	-
OTHER FRINGES	-	-
MATERIALS/SUPPLIES	1.02	1.02
CASUALTY/LIABILITY	1.08	1.08
FUEL SVC VEHICLE	-	-
TAXES	-	-
SERVICES	1.04	1.04
PURCHASED TRANSP	1.04	1.04
EXPENSE TRANSFERS	-	-
INTEREST EXPENSE	-	-
AMORT OF INTANGIBLES	-	-
TELEPHONE	1.03	1.03
OFFICE RENTAL	1.03	1.03
UTILITIES	-	-
OFFICE EQPT RENTAL	1.03	1.03
OTHER	1.03	1.03

**Step 3: Calculate Estimated Annual Costs**

The cost estimate for each line item expense account in each year is based on the cost escalation factor for that year and the prior year's cost estimate. For example, the line item expense account **Drivers Salaries** in the URTA example is estimated to be \$186,950 in the first year of the contract period based on a current year/baseline year cost of \$179,760 and a 1.04 cost escalation factor (See Exhibit 44). Other line item expense amounts were derived in a similar manner, that is, multiplying the current year/baseline year cost by its cost escalation factor. The URTA baseline costs in this example are the modified costs which resulted after the non-operational and bid specification costs were excluded. However, the baseline statistics used for cost escalation purposes could vary with local conditions and desires.

In this manner, overall operating costs for the URTA are expected to total \$534,141 and \$556,013 in the first and second years of the study period, respectively.

## Exhibit 44

Estimated Annual Operating Costs  
URTA Example

Expense Object Class	Baseline		
	Year	Year 1	Year 2
<b>VEHICLE OPERATIONS</b>			
DRIVERS SALARIES	\$179,762	\$186,950	\$194,428
DISPATCHERS SALARIES	28,047	29,169	30,336
PSSNGR. AID SALARIES	477	496	516
DRIVERS FRINGES	30,191	31,399	32,655
DISPATCHERS FRINGES	4,387	4,562	4,745
PASSENGER AID FRINGES	-	-	-
FUEL OIL	43,872	44,749	45,644
TUBES & TIRES	-	-	-
VEHICLE INSURANCE	34,734	37,513	40,514
VEHICLE LEASE	-	-	-
VEH LICENSE, REG, TAX	-	-	-
VEH STORAGE FAC RNTL	2,376	2,471	2,570
OTHER	489	509	529
<b>MAINTENANCE</b>			
MECHANICS SALARIES	11,088	11,532	11,993
OTHER WAGES	20,256	21,066	21,909
MECHANICS FRINGES	3,035	3,156	3,283
OTHER FRINGES	4,069	4,232	4,401
CASUALTY/LIABILITY	-	-	-
MAINTENANCE SVC CONTR	-	-	-
MATERIALS & SUPPLIES	10,788	11,004	11,224
MAINT FACILITY RNTL	-	-	-
EQUIPMENT RENTAL	-	-	-
UTILITIES	-	-	-
SERVICES	38,124	39,649	41,235
OTHER	-	-	-
<b>NON-VEHICLE MAINTENANCE</b>			
JANITORIAL WAGES	-	-	-
FRINGE BENEFITS	-	-	-
SERVICES	-	-	-
MATERIALS/SUPPLIES	-	-	-
OTHER	-	-	-
<b>ADMINISTRATION</b>			
ADMINISTRATORS SALARY	11,905	12,381	12,876
MANAGERS SALARY	187	194	202
DISPATCHERS SALARY	-	-	-
SECRETARYS SALARY	1,479	1,538	1,600
BOOKKEEPERS SALARY	-	-	-
OTHER SALARY	-	-	-
ADMINISTRATORS FRINGES	1,635	1,700	1,768
MANAGERS FRINGES	25	26	27
DISPATCHERS FRINGES	-	-	-
SECRETARYS FRINGES	206	214	223
BOOKKEEPERS FRINGES	-	-	-
OTHER FRINGES	-	-	-
MATERIALS/SUPPLIES	1,400	1,428	1,457
CASUALTY/LIABILITY	6,026	6,508	7,029
FUEL SVC VEHICLE	-	-	-
TAXES	-	-	-
SERVICES	317	330	343
PURCHASED TRANSP	67,380	70,075	72,878
EXPENSE TRANSFERS	-	-	-
INTEREST EXPENSE	-	-	-
AMORT OF INTANGIBLES	-	-	-
TELEPHONE	3,002	3,092	3,185
OFFICE RENTAL	7,294	7,513	7,738
UTILITIES	-	-	-
OFFICE EQPT RENTAL	527	543	559
OTHER	138	142	146
Totals	<u>\$513,214</u>	<u>\$534,141</u>	<u>\$556,013</u>

**Capital Cost Adjustments**

Preparing adjustments in capital costs consists of four-steps as described below (See Exhibit 45):

- (1) Identify capital cost line item expense accounts;
- (2) Determine the annual depreciation charge for existing assets;
- (3) Determine the annual depreciation charge for replacement or expansion assets; and
- (4) Determine total annual capital costs.

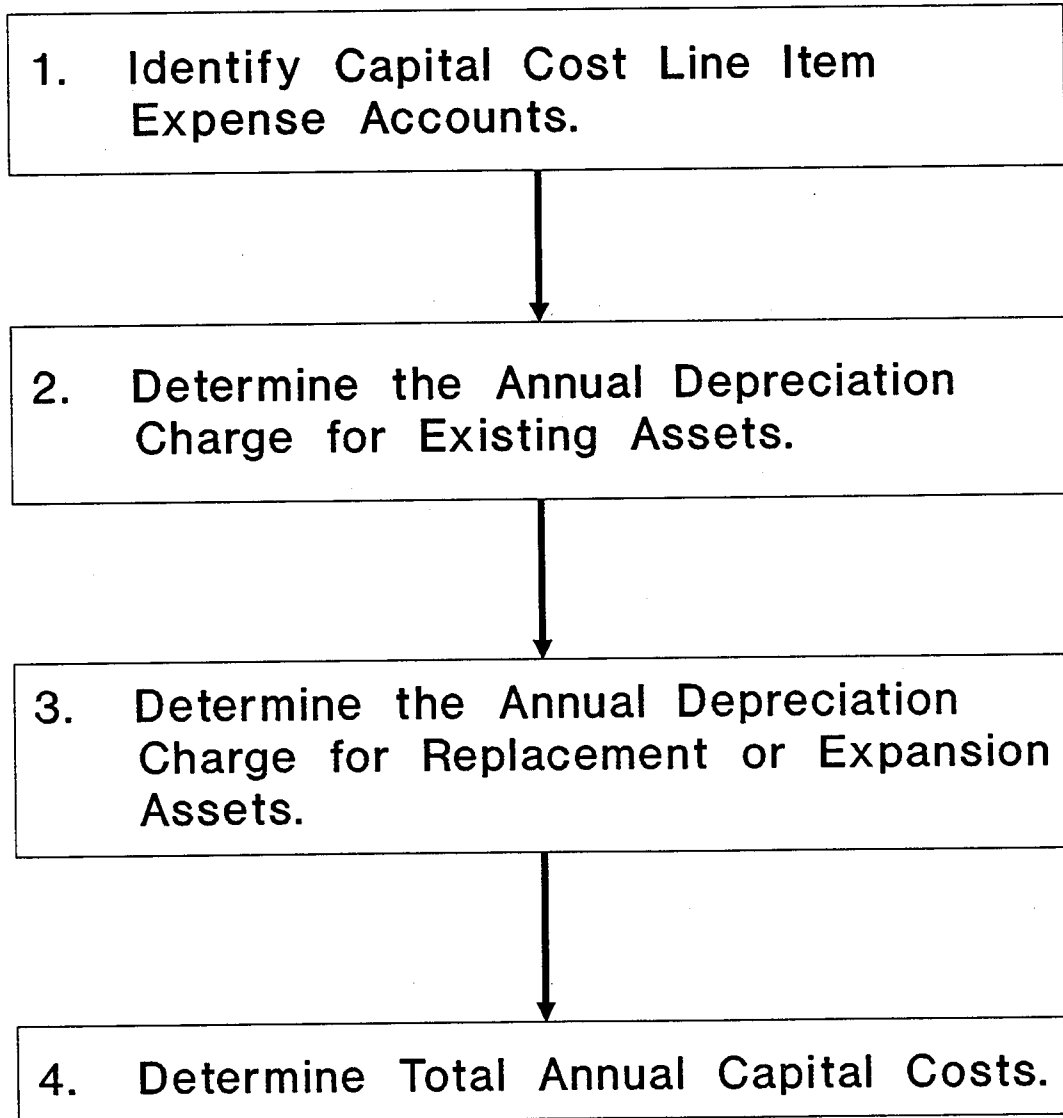
Each of these steps is described below.

**Step 1: Identify Capital Cost Line Item Expense Accounts**

The first step is relatively simple -- identify the line item expense accounts that are capital costs. Capital cost elements include all plant and equipment that are part of the contractor's bid to operate service. (In the URTA example, the agency intends to provide vehicle capital as part of the competitive procurement process. As a result, the bid specifications do not include any capital items in this case and, therefore, no adjustments in capital costs would occur. In light of these considerations, the following steps and accompanying example are presented for illustrative purposes only).

## Exhibit 45

### Capital Cost Adjustments



**Step 2: Determine the Annual Depreciation Charge for Existing Assets**

Typically, a depreciation schedule is established by the agency's financial manager for each of the agency's assets. In accordance with these schedules, the URTA depreciation expense is expected to be as follows during the contract period:

- o In year 1, depreciation expense is anticipated to total \$11,951. This number is comprised of \$8,404 for three of the agency's vehicles and \$3,547 for the URTA's radios. No miscellaneous depreciation is included (See Exhibit 46); and
- o In year 2, no depreciation expense is anticipated for the agency's existing assets since all assets will exceed their recommended capital recovery periods or "useful lives" (See Exhibit 46).



**Exhibit 46**

**Annual Depreciation Charge for Existing Assets**

**URTA Example**

Item Number	Full Cost Depreciation	
	Year 1	Year 2
<b>Existing Assets</b>		
<b>Vehicles</b>		
10	1,412	0
15	1,647	0
26	<u>5,345</u>	<u>0</u>
Subtotal Vehicles	\$8,404	\$0
<b>Radios</b>		
Base Radio	1,438	0
10	509	0
15	509	0
25	545	0
26	<u>546</u>	<u>0</u>
Subtotal Radios	\$3,547	\$0
Subtotal Existing Assets	\$11,951	\$0

**Step 3: Determine the Annual Depreciation Charge for Replacement or Expansion Assets**

Most transportation providers attempt to replace their assets on a uniform basis if possible. A uniform schedule of asset replacement provides for better control over maintenance expenses.

The URTA is not contemplating any change in its level of service during the contract period and is therefore planning only for the replacement of existing assets. According to the agency's financial manager, the URTA plans to purchase the following replacement assets:

- o In year 1, six vehicles will be acquired although, no radios or other miscellaneous assets will be purchased. As a result, the depreciation charge is expected to be \$25,750 given the anticipated purchase prices of these new vehicles (See Exhibit 47) For example, each van is expected to cost \$20,000 and to be in service for five years. Assuming no salvage value and the use of straight line depreciation yields a charge of \$4,000 in each year ( $\$20,000/5$  years); and their expected useful lives.
- o In year 2, two additional vehicles will be acquired although, no radios or other miscellaneous equipment will be purchased. Taken together with the six vehicles to be acquired in the first year of the contract period, the depreciation charge is expected to total \$34,750 (See Exhibit 47).

# Exhibit 47

## Annual Depreciation Charge for Replacement Assets

### URTA Example

Item Number	Full Cost Depreciation	
	Year 1	Year 2
Existing Assets		
Vehicles		
10	1,412	0
15	1,647	0
26	<u>5,345</u>	<u>0</u>
Subtotal Vehicles	\$8,404	\$0
Radios		
Base Radio	1,438	0
10	509	0
15	509	0
25	545	0
26	<u>546</u>	<u>0</u>
Subtotal Radios	\$3,547	\$0
Subtotal Existing Assets	\$11,951	\$0
Replacement Assets		
Vehicles		
Van	\$4,000	\$4,000
Van	4,000	4,000
Van with Lift	4,500	4,500
Van with Lift	4,500	4,500
Van with Lift	4,500	4,500
Station Wagon	4,250	4,250
Van with Lift	-	4,750
Van	<u>-</u>	<u>4,250</u>
Subtotal Replacement Assets	\$25,750	\$34,750

**Step 4: Determine Total Annual Capital Costs**

The total annual capital cost is the sum of the depreciation charges for the existing and replacement assets. In the URTA example, the annual capital costs are expected to be as follows:

- o In year 1, annual depreciation charges are forecast to be \$37,701 (See Exhibit 48); and
- o In year 2, annual depreciation charges are projected to be \$34,750 (See Exhibit 48).

# Exhibit 48

## Total Annual Capital Costs

### URTA Example

Item Number	Full Cost Depreciation	
	Year 1	Year 2
Existing Assets		
Vehicles		
10	1,412	0
15	1,647	0
26	<u>5,345</u>	<u>0</u>
Subtotal Vehicles	\$8,404	\$0
Radios		
Base Radio	1,438	0
10	509	0
15	509	0
25	545	0
26	<u>546</u>	<u>0</u>
Subtotal Radios	\$3,547	\$0
Subtotal Existing Assets	\$11,951	\$0
Replacement Assets		
Vehicles		
Van	\$4,000	\$4,000
Van	4,000	4,000
Van with Lift	4,500	4,500
Van with Lift	4,500	4,500
Van with Lift	4,500	4,500
Station Wagon	4,250	4,250
Van with Lift	-	4,750
Van	<u>-</u>	<u>4,250</u>
Subtotal Replacement Assets	\$25,750	\$34,750
Total Existing Replacement Assets	\$37,701	\$34,750

Future year cost allocation models can be developed following the three steps outlined below (See Exhibit 49):

- (1) Compile updated operating and capital cost data;
- (2) Assign line item expense accounts; and
- (3) Develop and apply the updated cost allocation model(s) to prepare the cost estimate.

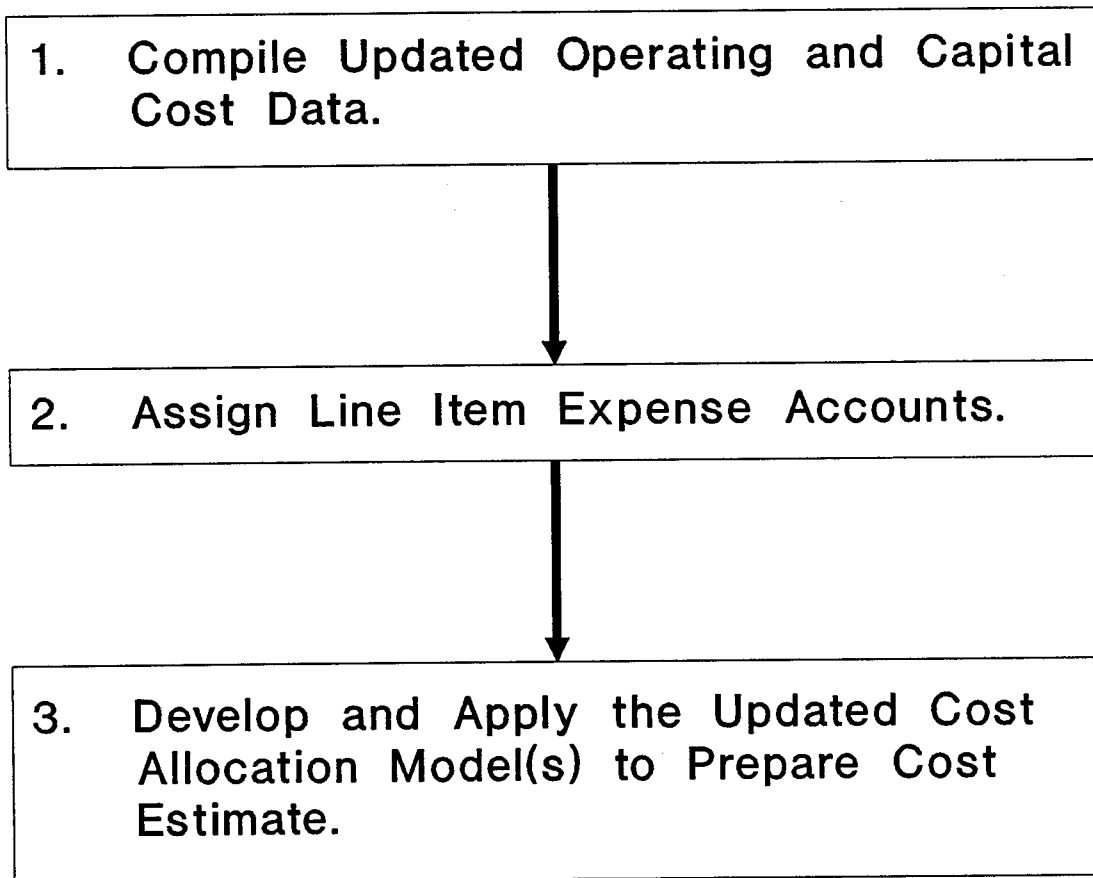
Each of these steps is described below.

**Step 1: Compile Updated Operating and Capital Cost Data**

This step is relatively simple -- compile the updated operating and capital cost data developed in the previous work tasks.

## Exhibit 49

### Future Year Model Development



**Step 2: Assign Line Item Expense Accounts**

In year 1, the updated line item expense accounts were assigned to one of the three resource variables; namely, hours, miles or vehicles. The line items should be assigned in the same way as was done in the development of the baseline model using the same basis of expense assignment (See Exhibit 13).

Of the estimated total of \$534,141, for the URTA modified bidding model, \$219,354 were assigned to hours of operation, \$147,603 were assigned to miles of operation and the balance of \$167,184 were assigned to vehicles in service (See Exhibit 50).



## Exhibit 50

## Future Year Cost Model

## URTA Expense Assignment: Year 1

Expense Object Class	Hours	Miles	Vehicles	Total
<b>VEHICLE OPERATIONS</b>				
DRIVERS SALARIES	186,950	0	0	186,950
DISPATCHERS SALARIES	0	0	29,169	29,169
PSSNGR. AID SALARIES	496	0	0	496
DRIVERS FRINGES	31,399	0	0	31,399
DISPATCHERS FRINGES	0	0	4,562	4,562
PASSENGER AID FRINGES	0	0	0	0
FUEL OIL	0	44,749	0	44,749
TUBES & TIRES	0	0	0	0
VEHICLE INSURANCE	0	37,513	0	37,513
VEHICLE LEASE	0	0	0	0
VEHICLE & OPERATIONS DEPRECIATION	0	0	0	0
VEH LICENSE, REG, TAX	0	0	0	0
VEH STORAGE FAC RNTL	0	0	2,471	2,471
OTHER	509	0	0	509
<b>MAINTENANCE</b>				
MECHANICS SALARIES	0	11,532	0	11,532
OTHER WAGES	0	0	21,066	21,066
MECHANICS FRINGES	0	3,156	0	3,156
OTHER FRINGES	0	0	4,232	4,232
CASUALTY/LIABILITY	0	0	0	0
MAINTENANCE SVC CONTR	0	0	0	0
MATERIALS & SUPPLIES	0	11,004	0	11,004
GARAGE & MAINTENANCE DEPRECIATION	0	0	0	0
MAINT FACILITY RNTL	0	0	0	0
EQUIPMENT RENTAL	0	0	0	0
UTILITIES	0	0	0	0
SERVICES	0	39,649	0	39,649
OTHER	0	0	0	0
<b>NON-VEHICLE MAINTENANCE</b>				
JANITORIAL WAGES	0	0	0	0
FRINGE BENEFITS	0	0	0	0
SERVICES	0	0	0	0
MATERIALS/SUPPLIES	0	0	0	0
NON-VEHICLE MAINTENANCE DEPRECIATION	0	0	0	0
OTHER	0	0	0	0
<b>ADMINISTRATION</b>				
ADMINISTRATORS SALARY	0	0	12,381	12,381
MANAGERS SALARY	0	0	194	194
DISPATCHERS SALARY	0	0	0	0
SECRETARYS SALARY	0	0	1,538	1,538
BOOKKEEPERS SALARY	0	0	0	0
OTHER SALARY	0	0	0	0
ADMINISTRATORS FRINGES	0	0	1,700	1,700
MANAGERS FRINGES	0	0	26	26
DISPATCHERS FRINGES	0	0	0	0
SECRETARYS FRINGES	0	0	214	214
BOOKKEEPERS FRINGES	0	0	0	0
OTHER FRINGES	0	0	0	0
MATERIALS/SUPPLIES	0	0	1,428	1,428
CASUALTY/LIABILITY	0	0	6,508	6,508
FUEL SVC VEHICLE	0	0	0	0
TAXES	0	0	0	0
SERVICES	0	0	330	330
PURCHASED TRANSP	0	0	70,075	70,075
EXPENSE TRANSFERS	0	0	0	0
INTEREST EXPENSE	0	0	0	0
AMORT OF INTANGIBLES	0	0	0	0
TELEPHONE	0	0	3,092	3,092
OFFICE RENTAL	0	0	7,513	7,513
OFFICE & ADMINISTRATION DEPRECIATION	0	0	0	0
UTILITIES	0	0	0	0
OFFICE EQPT RENTAL	0	0	543	543
OTHER	0	0	142	142
<b>Totals</b>	<b>\$219,354</b>	<b>\$147,603</b>	<b>\$167,184</b>	<b>\$534,141</b>

In year 2, of the forecast total of \$556,013, \$228,128 were assigned to hours of operation, \$153,893 were assigned to miles of operation and the remaining \$173,992 were assigned to vehicles in service (See Exhibit 51).

## Exhibit 51

## Future Year Cost Model

## URTA Expense Assignment: Year 2

Expense Object Class	Hours	Miles	Vehicles	Total
<b>VEHICLE OPERATIONS</b>				
DRIVERS SALARIES	194,428	0	0	194,428
DISPATCHERS SALARIES	0	0	30,336	30,336
PSSNGR. AID SALARIES	516	0	0	516
DRIVERS FRINGES	32,655	0	0	32,655
DISPATCHERS FRINGES	0	0	4,745	4,745
PASSENGER AID FRINGES	0	0	0	0
FUEL OIL	0	45,644	0	45,644
TUBES & TIRES	0	0	0	0
VEHICLE INSURANCE	0	40,514	0	40,514
VEHICLE LEASE	0	0	0	0
VEHICLE & OPERATIONS DEPRECIATION	0	0	0	0
VEH LICENSE, REG, TAX	0	0	0	0
VEH STORAGE FAC RNTL	0	0	2,570	2,570
OTHER	529	0	0	509
<b>MAINTENANCE</b>				
MECHANICS SALARIES	0	11,993	0	11,993
OTHER WAGES	0	0	21,909	21,909
MECHANICS FRINGES	0	3,283	0	3,283
OTHER FRINGES	0	0	4,401	4,401
CASUALTY/LIABILITY	0	0	0	0
MAINTENANCE SVC CONTR	0	0	0	0
MATERIALS & SUPPLIES	0	11,224	0	11,224
GARAGE & MAINTENANCE DEPRECIATION	0	0	0	0
MAINT FACILITY RNTL	0	0	0	0
EQUIPMENT RENTAL	0	0	0	0
UTILITIES	0	0	0	0
SERVICES	0	41,235	0	41,235
OTHER	0	0	0	0
<b>NON-VEHICLE MAINTENANCE</b>				
JANITORIAL WAGES	0	0	0	0
FRINGE BENEFITS	0	0	0	0
SERVICES	0	0	0	0
MATERIALS/SUPPLIES	0	0	0	0
NON-VEHICLE MAINTENANCE DEPRECIATION	0	0	0	0
OTHER	0	0	0	0
<b>ADMINISTRATION</b>				
ADMINISTRATORS SALARY	0	0	12,876	12,876
MANAGERS SALARY	0	0	202	202
DISPATCHERS SALARY	0	0	0	0
SECRETARYS SALARY	0	0	1,600	1,600
BOOKKEEPERS SALARY	0	0	0	0
OTHER SALARY	0	0	0	0
ADMINISTRATORS FRINGES	0	0	1,768	1,768
MANAGERS FRINGES	0	0	27	27
DISPATCHERS FRINGES	0	0	0	0
SECRETARYS FRINGES	0	0	223	223
BOOKKEEPERS FRINGES	0	0	0	0
OTHER FRINGES	0	0	0	0
MATERIALS/SUPPLIES	0	0	1,457	1,457
CASUALTY/LIABILITY	0	0	7,029	7,029
FUEL SVC VEHICLE	0	0	0	0
TAXES	0	0	0	0
SERVICES	0	0	343	343
PURCHASED TRANSP	0	0	72,878	72,878
EXPENSE TRANSFERS	0	0	0	0
INTEREST EXPENSE	0	0	0	0
AMORT OF INTANGIBLES	0	0	0	0
TELEPHONE	0	0	3,185	3,185
OFFICE RENTAL	0	0	7,738	7,738
OFFICE & ADMINISTRATION DEPRECIATION	0	0	0	0
UTILITIES	0	0	0	0
OFFICE EQPT RENTAL	0	0	559	559
OTHER	0	0	146	146
<b>Totals</b>	<b>\$228,128</b>	<b>\$153,893</b>	<b>\$173,992</b>	<b>\$556,013</b>

**Step 3: Develop and Apply the Updated Cost Allocation Model(s) to Prepare the Cost Estimate**

The average unit costs for the updated cost allocation models are calculated as before by dividing in each year the assigned cost for each variable by the value of the resource variable.

The level of service is not expected to change as reflected by the values of the resource variables. If the level of service was to change (i.e., a change in the hours and/or miles of service, the costs associated with these changes would be determined and included in the expenses. As such, the new level of hours and/or miles would be used here to calculate the unit costs.

The average unit cost factors reflect the average increases in costs expected to occur during the two-year contract period.

In year 1, the URTA average unit cost factors are anticipated to be as follows (See Exhibit 52):

- o \$7.61 per hour of operation;
- o \$0.31 per mile of operation; and
- o \$12,860.31 per vehicle in service.

Exhibit 52

Future Year Cost Model

URTA Example: Year 1

Basis of Assignment	Total Expenses Assigned	Value of Resource Variable	Average Unit Cost
Hours	\$219,354	28,811	\$7.61
Miles	147,603	473,512	0.31
Vehicles	<u>167,184</u>	13	12,860.31
TOTALS	\$534,141		

In year 2, the average unit cost factors are forecast to be as follows (See Exhibit 53):

- o \$7.92 per hour of operation;
- o \$0.33 per mile of operation; and
- o \$13,384.00 per vehicle in service.

Exhibit 53

Future Year Forma Cost Model

URTA Example: Year 2

Basis of Assignment	Total Expenses Assigned	Value of Resource Variable	Average Unit Cost
Hours	\$228,128	28,811	\$7.92
Miles	153,893	473,512	0.33
Vehicles	<u>173,992</u>	13	13,384.00
TOTALS	\$556,013		

At this point in the analysis process, the impacts of the non-operational and bid specification adjustments and the development of future year models can be examined. Generally, the cost adjustments decrease the values of the average unit costs while inflation increases the values of the average unit costs as reflected in the future year models.

The impact of operating and capital cost adjustments on the URTA baseline model can be clearly seen as described below (See Exhibit 54):

- o Overall costs decline from \$660,986 originally to \$513,214 after making the bid specification cost adjustments. Then, costs increase to \$534,141 in year 1 and to \$556,013 in year 2 of the presumed contract period;
- o The average unit cost per hour ranges from \$7.32 under the baseline model to \$7.92 under year 2 of the future year model. This increase is entirely attributable to the escalation in the line item expense accounts assigned to hours of operation during the contract period;
- o The average unit cost per mile remains relatively stable throughout the cost analysis. This result is due to offsetting factors -- decreases resulting from the bid specifications and increases resulting from the secular growth of prices; and
- o The average unit cost per vehicle decreases from \$23,332.69 originally to \$13,384.00 in year 2 of the future year model. This rather significant drop is primarily related to the non-operational cost adjustments made to the line item expense accounts assigned to vehicles in service.



**Exhibit 54**

**Impact of Operating and Capital Cost Adjustments**

**URTA Example**

	<b>Total Expenses Assigned</b>	<b>Average Unit Cost</b>		
		<b>Hours</b>	<b>Miles</b>	<b>Vehicles</b>
Baseline Model	\$660,986	\$7.32	\$0.31	\$23,332.6
After Non-Operational Cost Adjustments	547,939	7.32	0.31	14,636.77
After Bid Specification Cost Adjustments	513,214	7.32	0.30	12,358.15
Future Year: Year 1	534,141	7.61	0.31	12,860.31
Future Year: Year 2	556,013	7.92	0.33	13,384.00

The future year models can be used to provide a cost estimate during the contract period. In the URTA case, the fully allocated cost estimate is \$79,977 for the URTA to operate the sample service during the next two years (See Exhibit 55).

Exhibit 55

Future Year Models

URTA Cost of Sample Service - Years 1 and 2

Basis of Assignment	<u>Average Unit Cost</u>		Value of Resource Variable	<u>Total Cost</u>		
	Year 1	Year 2		Year 1	Year 2	Both
Hours	\$7.61	\$7.92	2,100	\$15,981	\$16,632	\$32,613
Miles	0.31	0.33	33,000	10,230	10,890	21,120
Vehicles	12,860.31	13,384.00	1	<u>12,860</u>	<u>13,384</u>	<u>26,244</u>
Total				\$39,071	\$40,906	\$79,977

The use of future year models in contracting situations produces an increase in the cost estimates for services.

Including the impact of inflation and other known price changes increases the cost estimate of the URTA sample service by an additional \$1,441 to \$39,071 in year 1 (See Exhibit 56). In year 2, the cost estimate of the sample service is expected to increase an additional \$1,835 to \$40,906.

**Exhibit 56**

**Comparison of Cost Estimates**

**URTA Sample Service**

	<b>Estimated Cost</b>	<b>Change from Prior Line</b>
Baseline Model	\$48,935	----
After Non-Operational Cost Adjustments	40,239	(\$8,696)
After Bid Specification Cost Adjustments	37,630	(2,609)
After Future Year Model Year 1	39,071	1,441
After Future Year Model Year 2	40,906	1,835



This chapter presents the process for adjusting the fully allocated cost model in order to estimate short-term (i.e., budgetary) cost impacts. The issue here is to identify the incremental costs that would be incurred or saved by a public agency during the length of a service contract. As such, the topics covered in this chapter are:

- o Incremental cost overview;
- o Incremental cost model development and application; and
- o Incremental cost/fully allocated cost relationship to competitive bidding.

### **Incremental Cost Overview**

Most of the previous discussions have focused on **cost allocation**. Cost allocation really means: How much does it cost to operate an existing service? As mentioned above, cost allocation is an important concept because it deals with the distribution or allocation of total costs to individual routes or services. Knowing the costs of individual routes or services is useful for funding purposes and for satisfying the competitive bidding requirements set forth in UMTA's Private Enterprise Policy.

On the other hand, if a local jurisdiction or non-profit agency decides to seriously consider contracting-out service, another issue becomes equally important: How much cost will the agency really save in the short-run if a given service is operated by a private provider? Or, alternatively, if a new service is being considered: How much cost will the agency actually incur in the short-run if a given service is operated by the agency itself? These questions relate more to **cost estimation**. Incremental cost is normally used for cost estimation purposes since this concept focuses on those costs that are likely to change in the short-run.

Developing and applying an incremental cost model consists of three steps (See Exhibit 57):

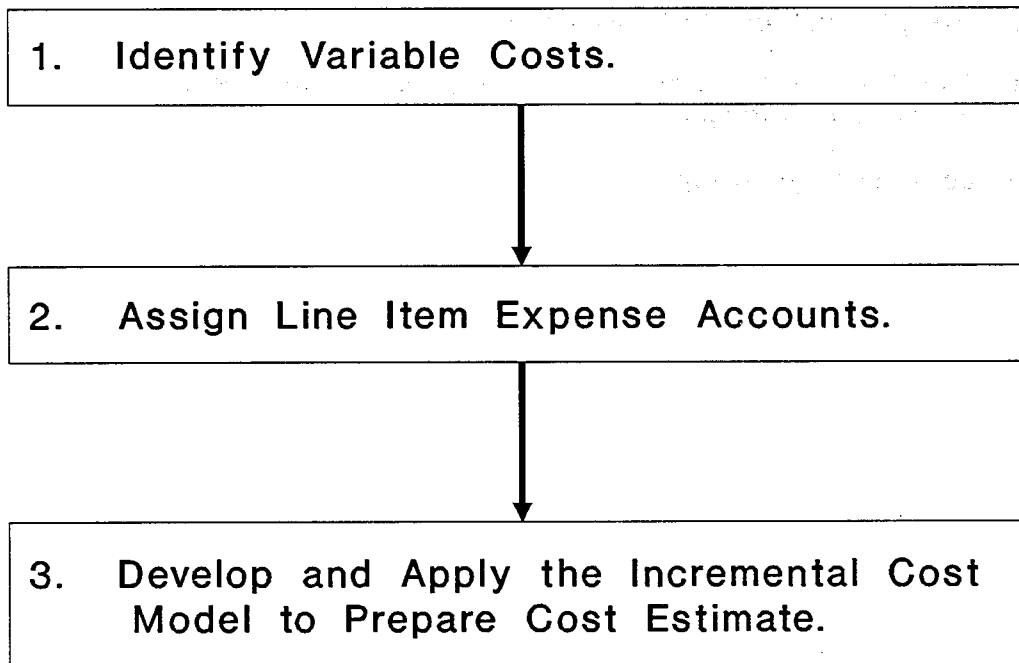
- (1) Identify variable costs;
- (2) Assign line item expense accounts; and
- (3) Develop and apply the incremental cost model to prepare cost estimate.

Each of these steps is described below.



## **Exhibit 57**

### **Incremental Cost Model Development and Application**



**Step 1: Identify Variable Costs**

Perhaps the most difficult step in the process is to identify those costs that are likely to change in the short-run (i.e., the variable costs) as opposed to those costs that are not likely to change in the short-run (i.e., the fixed costs). This step requires considerable judgement and a good understanding of cost accounting and cost behavior.

Categorizing costs must be done in the context of the change in service being contemplated. In the URTA case, for example, consideration is being given to contracting-out one service which represents about 7% of the overall hours, miles and vehicles scheduled by the agency. Given these characteristics, it is unlikely that any administrative and facility-related capital costs would be saved in the short-run if a private provider is selected to operate this service (See Exhibit 58). The real cost savings, or "avoidable" costs to the agency, would be more likely to occur in vehicle operations and maintenance.

Exhibit 58

Variable Cost Identification

URTA Example

Expense Object Class	Fixed/ Variable
VEHICLE OPERATIONS	
DRIVERS SALARIES	V
DISPATCHERS SALARIES	F
PSSNGR. AID SALARIES	V
DRIVERS FRINGES	V
DISPATCHERS FRINGES	F
PASSENGER AID FRINGES	V
FUEL OIL	V
TUBES & TIRES	V
VEHICLE INSURANCE	V
VEHICLE LEASE	F
VEHICLE & OPERATIONS DEPRECIATION	F
VEH LICENSE, REG, TAX	V
VEH STORAGE FAC RNTL	F
OTHER	V
MAINTENANCE	
MECHANICS SALARIES	V
OTHER WAGES	F
MECHANICS FRINGES	V
OTHER FRINGES	F
CASUALTY/LIABILITY	V
MAINTENANCE SVC CONTR	V
MATERIALS & SUPPLIES	V
MAINT FACILITY RNTL	F
EQUIPMENT RENTAL	F
GARAGE & MAINTENANCE DEPRECIATION	F
UTILITIES	F
SERVICES	V
OTHER	V
NON-VEHICLE MAINTENANCE	
JANITORIAL WAGES	F
FRINGE BENEFITS	F
SERVICES	F
MATERIALS/SUPPLIES	F
NON-VEHICLE MAINTENANCE DEPRECIATION	F
OTHER	F
ADMINISTRATION	
ADMINISTRATORS SALARY	F
MANAGERS SALARY	F
DISPATCHERS SALARY	F
SECRETARYS SALARY	F
BOOKKEEPERS SALARY	F
OTHER SALARY	F
ADMINISTRATORS FRINGES	F
MANAGERS FRINGES	F
DISPATCHERS FRINGES	F
SECRETARYS FRINGES	F
BOOKKEEPERS FRINGES	F
OTHER FRINGES	F
MATERIALS/SUPPLIES	F
CASUALTY/LIABILITY	F
FUEL SVC VEHICLE	F
TAXES	F
SERVICES	F
PURCHASED TRANSP	F
EXPENSE TRANSFERS	F
INTEREST EXPENSE	F
AMORT OF INTANGIBLES	F
TELEPHONE	F
OFFICE RENTAL	F
OFFICE & ADMINISTRATION DEPRECIATION	F
UTILITIES	F
OFFICE EQPT RENTAL	F

**Step 2: Assign Line Item Expense Accounts**

In year 1, the variable line item expense accounts were assigned to either hours or miles of operation. The costs that would normally be assigned to vehicles in service were excluded from the analysis since, by definition, these line item expense accounts generally represent the fixed costs of the agency. The line items should be assigned in the same way as was done in the development of the baseline model.

Of the estimated total of \$366,957 for the URTA modified bidding model, \$219,354 were assigned to hours of operation while the remaining \$147,603 were assigned to miles of operation (See Exhibit 59).

Exhibit 59

Incremental Cost Model

URTA Expense Assignment: Year 1

Expense Object Class	Hours	Miles	Total
VEHICLE OPERATIONS			
DRIVERS SALARIES	186,950	0	186,950
PSSNGR. AID SALARIES	496	0	496
DRIVERS FRINGES	31,399	0	31,399
PASSENGER AID FRINGES	0	0	0
FUEL OIL	0	44,749	44,749
TUBES & TIRES	0	0	0
VEHICLE INSURANCE	0	37,513	37,513
VEHICLE & OPERATIONS DEPRECIATION	0	0	0
VEH LICENSE, REG, TAX	0	0	0
OTHER	509	0	509
MAINTENANCE			
MECHANICS SALARIES	0	11,532	11,532
MECHANICS FRINGES	0	3,156	3,156
CASUALTY/LIABILITY	0	0	0
MAINTENANCE SVC. CONTR	0	0	0
MATERIALS & SUPPLIES	0	11,004	11,004
SERVICES	0	39,649	39,649
OTHER	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	\$219,354	\$147,603	\$366,957

In year 2, of the forecast total of \$382,021 in variable costs, \$228,128 were assigned to hours of operation while the balance of \$153,893 were assigned to miles of operation (See Exhibit 60).

# Exhibit 60

## Incremental Cost Model

### URTA Expense Assignment: Year 2

Expense Object Class	Hours	Miles	Total
VEHICLE OPERATIONS			
DRIVERS SALARIES	194,428	0	194,428
PSSNGR. AID SALARIES	516	0	516
DRIVERS FRINGES	32,655	0	32,655
PASSENGER AID FRINGES	0	0	0
FUEL OIL	0	45,644	45,644
TUBES & TIRES	0	0	0
VEHICLE INSURANCE	0	40,514	40,514
VEHICLE & OPERATIONS DEPRECIATION	0	0	0
VEH LICENSE, REG, TAX	0	0	0
OTHER	529	0	529
MAINTENANCE			
MECHANICS SALARIES	0	11,993	11,993
MECHANICS FRINGES	0	3,283	3,283
CASUALTY/LIABILITY	0	0	0
MAINTENANCE SVC. CONTR	0	0	0
MATERIALS & SUPPLIES	0	11,224	11,224
SERVICES	0	41,235	41,235
OTHER	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	\$228,128	\$153,893	\$382,021

**Step 3: Develop and Apply the Incremental Cost Model(s) to  
Prepare the Cost Estimate**

The average unit costs for the incremental cost allocation model are calculated as before by dividing in each year the assigned cost for each variable by the value of the resource variable.

In the URTA example, the average unit cost factor per hour of operation and per mile of operation are identical to the corresponding ratios developed for the future year model.

In year 1, the average unit cost factors are anticipated to be as follows (See Exhibit 61):

- o \$7.61 per hour of operation; and
- o \$0.31 per mile of operation.



Exhibit 61

Incremental Cost Model

URTA Example: Year 1

Basis of Assignment	Total Expenses Assigned	Value of Resource Variable	Average Unit Cost
Hours	\$219,354	28,811	\$7.61
Miles	<u>147,603</u>	473,512	0.31
Total	\$366,957		

In year 2, the average unit cost factors are forecast to be as follows (See Exhibit 62):

- o \$7.92 per hour of operation; and
- o \$0.33 per mile of operation.

**Exhibit 62**

**Incremental Cost Model**

**URTA Example: Year 2**

<b>Basis of Assignment</b>	<b>Total Expenses Assigned</b>	<b>Value of Resource Variable</b>	<b>Average Unit Cost</b>
<b>Hours</b>	<b>\$228,128</b>	<b>28,811</b>	<b>\$7.92</b>
<b>Miles</b>	<b><u>153,893</u></b>	<b>473,512</b>	<b>0.33</b>
<b>Total</b>	<b>\$382,021</b>		

The incremental cost models can be used in contracting situations to provide an estimate of the avoidable cost saving that would accrue to a public agency during the contract period should the agency decide to contract-out a service. In the URTA case, the incremental cost estimate is \$53,733 for the URTA to operate the sample service during the next two years (See Exhibit 63).

Exhibit 63

Incremental Cost Model: Years 1 and 2

URTA Cost of Sample Service

Basis of Assignment	<u>Average Unit Cost</u>		Value of Resource Variable	<u>Total Cost</u>		
	Year 1	Year 2		Year 1	Year 2	Both
Hours	\$7.61	\$7.92	2,100	\$15,981	\$16,632	\$32,613
Miles	0.31	0.33	33,000	<u>10,230</u>	<u>10,890</u>	<u>21,120</u>
Total				\$26,211	\$27,522	\$53,733

Excluding the fixed costs from the analysis decreases the cost estimate of the URTA sample service by \$14,695 to \$26,211 in year 1 (See Exhibit 64). In year 2, the cost estimate of the sample service is expected to grow by \$1,311 to \$27,522 due to inflationary increases anticipated for the agency's variable costs.

# **Exhibit 64**

## **Comparison of Cost Estimates**

### **URTA Sample Service**

	<b>Estimated Cost</b>	<b>Change from Prior Line</b>
Baseline Model	\$48,935	----
After Non-Operational Cost Adjustments	40,239	(\$8,696)
After Bid Specification Cost Adjustments	37,630	(\$2,609)
After Future Year Model Year 1	39,071	1,441
After Future Year Model Year 2	40,906	1,835
After Incremental Cost Model Year 1	26,211	(12,860)*
After Incremental Cost Model Year 2	27,522	1,311

\*Change compared to After Future Year Model: Year 1, two lines above.

The development of both incremental and fully allocated cost estimates can help to establish a framework for evaluating the competitive bids prepared by the local jurisdiction or non-profit agency and the private provider.

In general terms, the fully allocated cost estimate may be viewed as a "ceiling" for assessing the submitted bids while the incremental cost estimate may be viewed as a "floor" in the same manner. The following principles logically flow from this framework:

- (1) If the private provider's bid is greater than the fully allocated cost estimate prepared by the public agency, the service should be operated by the public agency since this arrangement would be more cost-effective for the taxpayer-at-large.

In the URTA example, the fully allocated cost estimate for the sample service over the two-year period totals \$79,977 (See Exhibit 65). The URTA should continue to operate this service with in-house personnel should a private provider's bid be greater than this amount.

- (2) If the private provider's bid is less than the incremental cost estimate prepared by the public agency, the service should be operated by the private provider since this arrangement would be more cost-effective for the taxpayer-at-large.

In the URTA example, the incremental cost estimate for the sample service over the two-year period totals \$53,733 (See Exhibit 65). The URTA should contract-out this service should a private provider's bid be less than this amount.

- (3) If the private provider's bid falls between the fully allocated and incremental cost estimates prepared by a public agency, other factors need to be considered before an economic decision can be rendered because the course of action is not clear.

In the URTA example, the incremental cost estimate for the sample service over the two-year period totals \$53,733 while the corresponding fully allocated cost estimate totals \$79,977. Other considerations need to be taken into account if the private provider's bid falls within this range (See Exhibit 65).



Exhibit 65

Incremental Cost/Fully Allocated Cost  
Relationship to Competitive Bidding

URTA Example

Private Provider's Bid

Decision

> \$79,977  
(Fully Allocated Cost)

Award service to agency

< \$53,733  
(Incremental Cost)

Award service to private  
provider

\$53,733 < bid < \$79,977

Consider other factors



WORKSHEET #1

MTA Chart of Accounts

Three Variable Model

Expense Object Class	Reported Expense
VEHICLE OPERATIONS	
DRIVERS SALARIES	_____
DISPATCHERS SALARIES	_____
PSSNGR. AID SALARIES	_____
FRINGE BENEFITS	_____
FUEL OIL	_____
TUBES & TIRES	_____
VEHICLE INSURANCE	_____
VEHICLE LEASE	_____
VEHICLE DEPRECIATION	_____
VEH LICENSE,REG,TAX	_____
VEH STORAGE FAC RNTL	_____
OTHER	_____
MAINTENANCE	
MECHANICS SALARIES	_____
OTHER WAGES	_____
FRINGE BENEFITS	_____
CASUALTY/LIABILITY	_____
MAINTENANCE SVC CONTR	_____
MATERIALS & SUPPLIES	_____
MAINT FACILITY RNTL	_____
EQUIPMENT RENTAL	_____
UTILITIES	_____
SERVICES	_____
OTHER	_____
NON-VEHICLE MAINTENANCE	
JANITORIAL WAGES	_____
FRINGE BENEFITS	_____
SERVICES	_____
MATERIALS/SUPPLIES	_____
OTHER	_____
ADMINISTRATION	
ADMINISTRATORS SALARY	_____
MANAGERS SALARY	_____
DISPATCHERS SALARY	_____
SECRETARYS SALARY	_____
BOOKKEEPERS SALARY	_____
OTHER SALARY	_____
FRINGE BENEFITS	_____
MATERIALS/SUPPLIES	_____
CASUALTY/LIABILITY	_____

**WORKSHEET #1**

**MTA Chart of Accounts**

**Three Variable Model  
(continued)**

<b>Expense Object Class</b>	<b>Reported Expense</b>
FUEL SVC VEHICLE	_____
TAXES	_____
SERVICES	_____
PURCHASED TRANSP	_____
EXPENSE TRANSFERS	_____
INTEREST EXPENSE	_____
AMORT OF INTANGIBLES	_____
TELEPHONE	_____
OFFICE RENTAL	_____
UTILITIES	_____
OFFICE EQPT RENTAL	_____
OTHER	_____
Totals	\$ _____

**Reference Exhibit 6 in Workbook**

## WORKSHEET #2

### MTA Chart of Accounts

#### Detailed Fringe Benefit Categories

#### Three Variable Model

Expense Object Class	Reported Expense
VEHICLE OPERATIONS	
DRIVERS SALARIES	_____
DISPATCHERS SALARIES	_____
PSSNGR. AID SALARIES	_____
DRIVERS FRINGES	_____
DISPATCHERS FRINGES	_____
PASSENGER AID FRINGES	_____
FUEL OIL	_____
TUBES & TIRES	_____
VEHICLE INSURANCE	_____
VEHICLE LEASE	_____
VEHICLE DEPRECIATION	_____
VEH LICENSE,REG,TAX	_____
VEH STORAGE FAC RNTL	_____
OTHER	_____
MAINTENANCE	
MECHANICS SALARIES	_____
OTHER WAGES	_____
MECHANICS FRINGES	_____
OTHER FRINGES	_____
CASUALTY/LIABILITY	_____
MAINTENANCE SVC CONTR	_____
MATERIALS & SUPPLIES	_____
MAINT FACILITY RNTL	_____
EQUIPMENT RENTAL	_____
UTILITIES	_____
SERVICES	_____
OTHER	_____
NON-VEHICLE MAINTENANCE	
JANITORIAL WAGES	_____
FRINGE BENEFITS	_____
SERVICES	_____
MATERIALS/SUPPLIES	_____
OTHER	_____
ADMINISTRATION	
ADMINISTRATORS SALARY	_____
MANAGERS SALARY	_____
DISPATCHERS SALARY	_____
SECRETARYS SALARY	_____
BOOKKEEPERS SALARY	_____

**WORKSHEET #2**

**MTA Chart of Accounts**

**Detailed Fringe Benefit Categories**

**Three Variable Model  
(continued)**

<b>Expense Object Class</b>	<b>Reported Expense</b>
OTHER SALARY	_____
ADMINISTRATORS FRINGES	_____
MANAGERS FRINGES	_____
DISPATCHERS FRINGES	_____
SECRETARYS FRINGES	_____
BOOKKEEPERS FRINGES	_____
OTHER FRINGES	_____
MATERIALS/SUPPLIES	_____
CASUALTY/LIABILITY	_____
FUEL SVC VEHICLE	_____
TAXES	_____
SERVICES	_____
PURCHASED TRANSP	_____
EXPENSE TRANSFERS	_____
INTEREST EXPENSE	_____
AMORT OF INTANGIBLES	_____
TELEPHONE	_____
OFFICE RENTAL	_____
UTILITIES	_____
OFFICE EQPT RENTAL	_____
OTHER	_____
Totals	\$ _____

**Reference Exhibit 8 in Workbook**

### WORKSHEET #3

#### Modification for Vehicle and Operations Depreciation

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
VEHICLE OPERATIONS				
DRIVERS SALARIES	_____	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____	_____
FUEL OIL	_____	_____	_____	_____
TUBES & TIRES	_____	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____	_____
VEHICLE LEASE	_____	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____	_____
VEH LICENSE,REG,TAX	_____	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
MAINTENANCE				
MECHANICS SALARIES	_____	_____	_____	_____
OTHER WAGES	_____	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____	_____
GARAGE & MAINT. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	_____	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
NON-VEHICLE DEPRECIATION	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
ADMINISTRATION	_____	_____	_____	_____
ADMINISTRATORS SALARY	_____	_____	_____	_____
MANAGERS SALARY	_____	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____	_____
SECRETARYS SALARY	_____	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____	_____
OTHER SALARY	_____	_____	_____	_____

### WORKSHEET #3

#### Modification for Vehicle and Operations Depreciation (continued)

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
ADMINISTRATORS FRINGES	_____	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 10 in Workbook



# WORKSHEET #4

## Modification for Shared Costs

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
VEHICLE OPERATIONS				
DRIVERS SALARIES	_____	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____	_____
FUEL OIL	_____	_____	_____	_____
TUBES & TIRES	_____	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____	_____
VEHICLE LEASE	_____	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____	_____
VEH LICENSE, REG, TAX	_____	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
MAINTENANCE				
MECHANICS SALARIES	_____	_____	_____	_____
OTHER WAGES	_____	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____	_____
GARAGE & MAINT. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	_____	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
NON-VEHICLE DEPRECIATION	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
ADMINISTRATION	_____	_____	_____	_____
ADMINISTRATORS SALARY	_____	_____	_____	_____
MANAGERS SALARY	_____	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____	_____
SECRETARYS SALARY	_____	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____	_____
OTHER SALARY	_____	_____	_____	_____

# WORKSHEET #4

## Modification for Shared Costs (continued)

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
ADMINISTRATORS FRINGES	_____	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 11 in Workbook

## WORKSHEET #5

### Modification for Publicly - Donated Services

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
VEHICLE OPERATIONS				
DRIVERS SALARIES	_____	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____	_____
FUEL OIL	_____	_____	_____	_____
TUBES & TIRES	_____	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____	_____
VEHICLE LEASE	_____	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____	_____
VEH LICENSE, REG, TAX	_____	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
MAINTENANCE				
MECHANICS SALARIES	_____	_____	_____	_____
OTHER WAGES	_____	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____	_____
GARAGE & MAINT. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	_____	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
NON-VEHICLE DEPRECIATION	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
ADMINISTRATION	_____	_____	_____	_____
ADMINISTRATORS SALARY	_____	_____	_____	_____
MANAGERS SALARY	_____	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____	_____
SECRETARYS SALARY	_____	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____	_____
OTHER SALARY	_____	_____	_____	_____

## WORKSHEET #5

### Modification for Publicly - Donated Services (continued)

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
ADMINISTRATORS FRINGES	_____	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 12 in Workbook

## WORKSHEET #6

### Modification for Privately - Donated Services

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
VEHICLE OPERATIONS				
DRIVERS SALARIES	_____	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____	_____
FUEL OIL	_____	_____	_____	_____
TUBES & TIRES	_____	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____	_____
VEHICLE LEASE	_____	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____	_____
VEH LICENSE, REG, TAX	_____	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
MAINTENANCE				
MECHANICS SALARIES	_____	_____	_____	_____
OTHER WAGES	_____	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____	_____
GARAGE & MAINT. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	_____	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
NON-VEHICLE DEPRECIATION	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
ADMINISTRATION	_____	_____	_____	_____
ADMINISTRATORS SALARY	_____	_____	_____	_____
MANAGERS SALARY	_____	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____	_____
SECRETARYS SALARY	_____	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____	_____
OTHER SALARY	_____	_____	_____	_____

## WORKSHEET #6

### Modification for Privately - Donated Services (continued)

Expense Object Class	Reported Expense	Revision	Revised Expense	Comment
ADMINISTRATORS FRINGES	_____	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 13 in Workbook

**WORKSHEET #7**

**MTA Chart of Accounts**

**Basis for Expense Assignment**

**Three Variable Model Development**

<b>Expense Object Class</b>	<b>Hours</b>	<b>Miles</b>	<b>Vehicles</b>
<b>VEHICLE OPERATIONS</b>			
DRIVERS SALARIES	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____
FUEL OIL	_____	_____	_____
TUBES & TIRES	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____
VEHICLE LEASE	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____
VEH LICENSE,REG,TAX	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____
OTHER	_____	_____	_____
<b>MAINTENANCE</b>			
MECHANICS SALARIES	_____	_____	_____
OTHER WAGES	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____
OTHER FRINGES	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____
GARAGE & MAINT. DEPRECIATION	_____	_____	_____
UTILITIES	_____	_____	_____
SERVICES	_____	_____	_____
OTHER	_____	_____	_____
<b>NON-VEHICLE MAINTENANCE</b>			
JANITORIAL WAGES	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____
SERVICES	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____
NON-VEHICLE DEPRECIATION	_____	_____	_____
OTHER	_____	_____	_____
<b>ADMINISTRATION</b>			
ADMINISTRATORS SALARY	_____	_____	_____
MANAGERS SALARY	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____

## WORKSHEET #7

### MTA Chart of Accounts

#### Basis for Expense Assignment

#### Three Variable Model Development (continued)

Expense Object Class	Hours	Miles	Vehicles
SECRETARYS SALARY	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____
OTHER SALARY	_____	_____	_____
ADMINISTRATORS FRINGES	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____
BOOKKEEPERS FRINGES	_____	_____	_____
OTHER FRINGES	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____
TAXES	_____	_____	_____
SERVICES	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____
TELEPHONE	_____	_____	_____
OFFICE RENTAL	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____
UTILITIES	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____
OTHER	_____	_____	_____

Reference Exhibit 14 in Workbook



## WORKSHEET #8

### Expense Assignment

#### Three Variable Model Development

Expense Object Class	Hours	Miles	Vehicles	Total
VEHICLE OPERATIONS				
DRIVERS SALARIES				
DISPATCHERS SALARIES				
PSSNGR. AID SALARIES				
DRIVERS FRINGES				
DISPATCHERS FRINGES				
PASSENGER AID FRINGES				
FUEL OIL				
TUBES & TIRES				
VEHICLE INSURANCE				
VEHICLE LEASE				
VEHICLE & OPER. DEPRECIATION				
VEH LICENSE,REG,TAX				
VEH STORAGE FAC RNTL				
OTHER				
MAINTENANCE				
MECHANICS SALARIES				
OTHER WAGES				
MECHANICS FRINGES				
OTHER FRINGES				
CASUALTY/LIABILITY				
MAINTENANCE SVC CONTR				
MATERIALS & SUPPLIES				
MAINT FACILITY RNTL				
EQUIPMENT RENTAL				
GARAGE & MAINT. DEPRECIATION				
UTILITIES				
SERVICES				
OTHER				
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES				
FRINGE BENEFITS				
SERVICES				
MATERIALS/SUPPLIES				
NON-VEHICLE DEPRECIATION				
OTHER				
ADMINISTRATION				
ADMINISTRATORS SALARY				
MANAGERS SALARY				
DISPATCHERS SALARY				
SECRETARYS SALARY				
BOOKKEEPERS SALARY				
OTHER SALARY				

# WORKSHEET #8

## Expense Assignment

### Three Variable Model Development (continued)

Expense Object Class	Hours	Miles	Vehicles	Total
ADMINISTRATORS FRINGES	_____	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 15 in Workbook

## WORKSHEET #9

### Average Unit Costs

#### Three Variable Model Development

Basis of Assignment	Total Expenses Assigned (1)	Value of Resource Variable (2)	Average Unit Cost (3) = (1)/(2)
Hours	_____	_____	_____
Miles	_____	_____	_____
Vehicles	_____	_____	_____
TOTALS	\$ _____		

Reference Exhibit 16 in Workbook



## WORKSHEET #10

### Average Unit Costs

### Three Variable Model Development

### Local Cost Model

Basis of Assignment	Total Expenses Assigned	Value of Resource Variable	Average Unit Cost
Hours	_____	_____	_____
Miles	_____	_____	_____
Vehicles	_____	_____	_____
TOTALS	\$ _____	_____	_____

Reference Exhibit 17 in Workbook



## **WORKSHEET #11**

### **Fully Allocated Cost Model**

#### **Three Vairable Model Applications**

#### **Step 1: Calculate Service-Specific Values for Each Resource Variable**

##### **Resource Variable**

##### **Value of Resource Variable**

Hours

\_\_\_\_\_

Miles

\_\_\_\_\_

Vehicles

\_\_\_\_\_

**Reference Exhibit 19 in Workbook**





## WORKSHEET #12

### Fully Allocated Cost Model

#### Three Variable Model Application

#### Step 2: Calculate Fully Allocated Cost Estimate

Resource Variable	Average Unit Cost	Value of Resource Variable	Total Cost
Hours	_____	_____	_____
Miles	_____	_____	_____
Vehicles	_____	_____	_____
Total			_____

Reference Exhibit 20 in Workbook



## **WORKSHEET #13**

### **Local Cost Model: Example 1**

#### **Three Variable Model Application**

#### **Step 1: Calculate Service-Specific Values for Each Resource Variable**

<b>Resource Variable</b>	<b>Value of Resource Variable</b>
Hours	_____
Miles	_____
Vehicles	_____

**Reference Exhibit 21 in Workbook**



## WORKSHEET #14

### Local Cost Model: Example 1

#### Three Variable Model Application

#### Step 2: Calculate Local Cost Estimate

Resource Variable	Average Unit Cost	Value of Resource Variable	Total Cost
Hours	_____	_____	_____
Miles	_____	_____	_____
Vehicles	_____	_____	_____
Total			_____

Reference Exhibit 22 in Workbook



## WORKSHEET #15

### Local Cost Model: Example 1

#### Distribution of Multi-Agency Service Cost

Agency	Ridership	% of Total	Total Cost	Distributed Cost
Rehabilitation Institute	_____	_____	_____	_____
Vocational Counseling Ctr	_____	_____	_____	_____
Total	\$ _____	_____	_____	_____

Reference Exhibit 23 in Workbook





## WORKSHEET #16

### Local Cost Model: Example 2

Step 1: Calculate Service - Specific Values  
for each Resource Variable

Resource Variable	Service A	Service B	Total
Hours	_____	_____	_____
Miles	_____	_____	_____
Vehicles	_____	_____	_____

Reference Exhibit 24 in Workbook



## WORKSHEET #17

### Local Cost Model: Example 2

#### Three Variable Model Application

#### Step 2: Calculate Local Cost Estimate

Resource Variable	Average Unit Cost	Value of Resource Variable		Total Cost	
		City	Suburb	City	Suburb
Hours	_____	_____	_____	_____	_____
Miles	_____	_____	_____	_____	_____
Vehicles	_____	_____	_____	_____	_____
		Total		_____	_____

Reference Exhibit 25 in Workbook



# WORKSHEET #18

## Local Cost Model: Example 2

### Distribution of Multi-Funding Service Cost

Service	Ridership by Funding Source			Percentage			Total Cost	Distributed Cost	
	1	2	Total	1	2	Total		1	2
A	_____	_____	_____	_____	_____	_____	_____	_____	_____
B	_____	_____	_____	_____	_____	_____	_____	_____	_____
Total								_____	_____

Reference Exhibit 26 in Workbook



## WORKSHEET #19

### Non-Operational Cost Adjustments to the Baseline Model

Expense Object Class	Hours	Miles	Vehicles	Change
VEHICLE OPERATIONS				
DRIVERS SALARIES	_____	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____	_____
FUEL OIL	_____	_____	_____	_____
TUBES & TIRES	_____	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____	_____
VEHICLE LEASE	_____	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____	_____
VEH LICENSE,REG,TAX	_____	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
MAINTENANCE				
MECHANICS SALARIES	_____	_____	_____	_____
OTHER WAGES	_____	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____	_____
GARAGE & MAINT. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	_____	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
NON VEHICLE MAINT. DEPRECIATION	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
ADMINISTRATION				
ADMINISTRATORS SALARY	_____	_____	_____	_____
MANAGERS SALARY	_____	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____	_____
SECRETARYS SALARY	_____	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____	_____
OTHER SALARY	_____	_____	_____	_____
ADMINISTRATORS FRINGES	_____	_____	_____	_____

# WORKSHEET #19

## Non-Operational Cost Adjustments to the Baseline Model (continued)

Expense Object Class	Hours	Miles	Vehicles	Change
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 30 in Workbook



## WORKSHEET #20

### Bid Specification Cost Adjustments to the Baseline Model

Expense Object Class	Hours	Miles	Vehicles	Change
VEHICLE OPERATIONS				
DRIVERS SALARIES				
DISPATCHERS SALARIES				
PSSNGR. AID SALARIES				
DRIVERS FRINGES				
DISPATCHERS FRINGES				
PASSENGER AID FRINGES				
FUEL OIL				
TUBES & TIRES				
VEHICLE INSURANCE				
VEHICLE LEASE				
VEHICLE & OPER. DEPRECIATION				
VEH LICENSE, REG, TAX				
VEH STORAGE FAC RNTL				
OTHER				
MAINTENANCE				
MECHANICS SALARIES				
OTHER WAGES				
MECHANICS FRINGES				
OTHER FRINGES				
CASUALTY/LIABILITY				
MAINTENANCE SVC CONTR				
MATERIALS & SUPPLIES				
MAINT FACILITY RNTL				
EQUIPMENT RENTAL				
GARAGE & MAINT. DEPRECIATION				
UTILITIES				
SERVICES				
OTHER				
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES				
FRINGE BENEFITS				
SERVICES				
MATERIALS/SUPPLIES				
NON VEHICLE MAINT. DEPRECIATION				
OTHER				
ADMINISTRATION				
ADMINISTRATORS SALARY				
MANAGERS SALARY				
DISPATCHERS SALARY				
SECRETARYS SALARY				
BOOKKEEPERS SALARY				
OTHER SALARY				
ADMINISTRATORS FRINGES				

# WORKSHEET #20

## Bid Specification Cost Adjustments to the Baseline Model (continued)

Expense Object Class	Hours	Miles	Vehicles	Change
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 37 in Workbook

## WORKSHEET #21

### Operating Cost Escalation Factors

#### Future Year Projections

Expense Object Class	Year 1	Year 2
VEHICLE OPERATIONS		
DRIVERS SALARIES	_____	_____
DISPATCHERS SALARIES	_____	_____
PSSNGR. AID SALARIES	_____	_____
DRIVERS FRINGES	_____	_____
DISPATCHERS FRINGES	_____	_____
PASSENGER AID FRINGES	_____	_____
FUEL OIL	_____	_____
TUBES & TIRES	_____	_____
VEHICLE INSURANCE	_____	_____
VEHICLE LEASE	_____	_____
VEH LICENSE,REG,TAX	_____	_____
VEH STORAGE FAC RNTL	_____	_____
OTHER	_____	_____
MAINTENANCE		
MECHANICS SALARIES	_____	_____
OTHER WAGES	_____	_____
MECHANICS FRINGES	_____	_____
OTHER FRINGES	_____	_____
CASUALTY/LIABILITY	_____	_____
MAINTENANCE SVC CONTR	_____	_____
MATERIALS & SUPPLIES	_____	_____
MAINT FACILITY RNTL	_____	_____
EQUIPMENT RENTAL	_____	_____
UTILITIES	_____	_____
SERVICES	_____	_____
OTHER	_____	_____
NON-VEHICLE MAINTENANCE		
JANITORIAL WAGES	_____	_____
FRINGE BENEFITS	_____	_____
SERVICES	_____	_____
MATERIALS/SUPPLIES	_____	_____
OTHER	_____	_____
ADMINISTRATION		
ADMINISTRATORS SALARY	_____	_____
MANAGERS SALARY	_____	_____
DISPATCHERS SALARY	_____	_____
SECRETARYS SALARY	_____	_____
BOOKKEEPERS SALARY	_____	_____
OTHER SALARY	_____	_____
ADMINSTRATORS FRINGES	_____	_____
MANAGERS FRINGES	_____	_____

## WORKSHEET #21

### Operating Cost Escalation Factors

#### Future Year Projections (continued)

Expense Object Class	Year 1	Year 2
DISPATCHERS FRINGES	_____	_____
SECRETARYS FRINGES	_____	_____
BOOKKEEPERS FRINGES	_____	_____
OTHER FRINGES	_____	_____
MATERIALS/SUPPLIES	_____	_____
CASUALTY/LIABILITY	_____	_____
FUEL SVC VEHICLE	_____	_____
TAXES	_____	_____
SERVICES	_____	_____
PURCHASED TRANSP	_____	_____
EXPENSE TRANSFERS	_____	_____
INTEREST EXPENSE	_____	_____
AMORT OF INTANGIBLES	_____	_____
TELEPHONE	_____	_____
OFFICE RENTAL	_____	_____
UTILITIES	_____	_____
OFFICE EQPT RENTAL	_____	_____
OTHER	_____	_____

Reference Exhibit 43 in Workbook

## WORKSHEET #22

### Estimated Annual Operating Costs

#### Future Year Projections

Expense Object Class	Baseline Year	Year 1	Year 2
VEHICLE OPERATIONS			
DRIVERS SALARIES	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____
FUEL OIL	_____	_____	_____
TUBES & TIRES	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____
VEHICLE LEASE	_____	_____	_____
VEH LICENSE, REG, TAX	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____
OTHER	_____	_____	_____
MAINTENANCE			
MECHANICS SALARIES	_____	_____	_____
OTHER WAGES	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____
OTHER FRINGES	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____
UTILITIES	_____	_____	_____
SERVICES	_____	_____	_____
OTHER	_____	_____	_____
NON-VEHICLE MAINTENANCE			
JANITORIAL WAGES	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____
SERVICES	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____
OTHER	_____	_____	_____
ADMINISTRATION			
ADMINISTRATORS SALARY	_____	_____	_____
MANAGERS SALARY	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____
SECRETARYS SALARY	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____
OTHER SALARY	_____	_____	_____
ADMINSTRATORS FRINGES	_____	_____	_____

## WORKSHEET #22

### Estimated Annual Operating Costs

#### Future Year Projections (continued)

Expense Object Class	Baseline Year	Year 1	Year 2
MANAGERS FRINGES	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____
BOOKKEEPERS FRINGES	_____	_____	_____
OTHER FRINGES	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____
TAXES	_____	_____	_____
SERVICES	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____
TELEPHONE	_____	_____	_____
OFFICE RENTAL	_____	_____	_____
UTILITIES	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____
OTHER	_____	_____	_____
TOTALS	\$ _____	_____	_____

Reference Exhibit 44 in Workbook

# WORKSHEET #23

## Future Year Model Development

### Expense Assignment: Year 1

Expense Object Class	Hours	Miles	Vehicles	Total
VEHICLE OPERATIONS				
DRIVERS SALARIES	_____	_____	_____	_____
DISPATCHERS SALARIES	_____	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____	_____
FUEL OIL	_____	_____	_____	_____
TUBES & TIRES	_____	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____	_____
VEHICLE LEASE	_____	_____	_____	_____
VEHICLE & OPER.	_____	_____	_____	_____
VEH LICENSE,REG,TAX	_____	_____	_____	_____
VEH STORAGE FAC RNTL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
MAINTENANCE				
MECHANICS SALARIES	_____	_____	_____	_____
OTHER WAGES	_____	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
MAINTENANCE SVC CONTR	_____	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____	_____
MAINT FACILITY RNTL	_____	_____	_____	_____
EQUIPMENT RENTAL	_____	_____	_____	_____
GARAGE & MAINT. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES	_____	_____	_____	_____
FRINGE BENEFITS	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
NON-VEHICLE DEPRECIATION	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
ADMINISTRATION				
ADMINISTRATORS SALARY	_____	_____	_____	_____
MANAGERS SALARY	_____	_____	_____	_____
DISPATCHERS SALARY	_____	_____	_____	_____
SECRETARYS SALARY	_____	_____	_____	_____
BOOKKEEPERS SALARY	_____	_____	_____	_____
OTHER SALARY	_____	_____	_____	_____

**WORKSHEET #23**

**Future Year Model Development**

**Expense Assignment: Year 1  
(continued)**

<b>Expense Object Class</b>	<b>Hours</b>	<b>Miles</b>	<b>Vehicles</b>	<b>Total</b>
ADMINISTRATORS FRINGES	_____	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

**Reference Exhibit 50 in Workbook**



## WORKSHEET #24

### Future Year Model Development

#### Expense Assignment: Year 2

Expense Object Class	Hours	Miles	Vehicles	Total
VEHICLE OPERATIONS				
DRIVERS SALARIES				
DISPATCHERS SALARIES				
PSSNGR. AID SALARIES				
DRIVERS FRINGES				
DISPATCHERS FRINGES				
PASSENGER AID FRINGES				
FUEL OIL				
TUBES & TIRES				
VEHICLE INSURANCE				
VEHICLE LEASE				
VEHICLE & OPER.				
VEH LICENSE, REG, TAX				
VEH STORAGE FAC RNTL				
OTHER				
MAINTENANCE				
MECHANICS SALARIES				
OTHER WAGES				
MECHANICS FRINGES				
OTHER FRINGES				
CASUALTY/LIABILITY				
MAINTENANCE SVC CONTR				
MATERIALS & SUPPLIES				
MAINT FACILITY RNTL				
EQUIPMENT RENTAL				
GARAGE & MAINT. DEPRECIATION				
UTILITIES				
SERVICES				
OTHER				
NON-VEHICLE MAINTENANCE				
JANITORIAL WAGES				
FRINGE BENEFITS				
SERVICES				
MATERIALS/SUPPLIES				
NON-VEHICLE DEPRECIATION				
OTHER				
ADMINISTRATION				
ADMINISTRATORS SALARY				
MANAGERS SALARY				
DISPATCHERS SALARY				
SECRETARYS SALARY				
BOOKKEEPERS SALARY				
OTHER SALARY				

## WORKSHEET #24

### Future Year Model Development

#### Expense Assignment: Year 2 (continued)

Expense Object Class	Hours	Miles	Vehicles	Total
ADMINISTRATORS FRINGES	_____	_____	_____	_____
MANAGERS FRINGES	_____	_____	_____	_____
DISPATCHERS FRINGES	_____	_____	_____	_____
SECRETARYS FRINGES	_____	_____	_____	_____
BOOKKEEPERS FRINGES	_____	_____	_____	_____
OTHER FRINGES	_____	_____	_____	_____
MATERIALS/SUPPLIES	_____	_____	_____	_____
CASUALTY/LIABILITY	_____	_____	_____	_____
FUEL SVC VEHICLE	_____	_____	_____	_____
TAXES	_____	_____	_____	_____
SERVICES	_____	_____	_____	_____
PURCHASED TRANSP	_____	_____	_____	_____
EXPENSE TRANSFERS	_____	_____	_____	_____
INTEREST EXPENSE	_____	_____	_____	_____
AMORT OF INTANGIBLES	_____	_____	_____	_____
TELEPHONE	_____	_____	_____	_____
OFFICE RENTAL	_____	_____	_____	_____
OFFICE & ADMIN. DEPRECIATION	_____	_____	_____	_____
UTILITIES	_____	_____	_____	_____
OFFICE EQPT RENTAL	_____	_____	_____	_____
OTHER	_____	_____	_____	_____
Totals	\$ _____	_____	_____	_____

Reference Exhibit 51 in Workbook

## WORKSHEET #25

### Variable Cost Identification

#### Incremental Cost Model

Expense Object Class	Fixed/ Variable
VEHICLE OPERATIONS	
DRIVERS SALARIES	_____
DISPATCHERS SALARIES	_____
PSSNGR. AID SALARIES	_____
DRIVERS FRINGES	_____
DISPATCHERS FRINGES	_____
PASSENGER AID FRINGES	_____
FUEL OIL	_____
TUBES & TIRES	_____
VEHICLE INSURANCE	_____
VEHICLE LEASE	_____
VEHICLE & OPER. DEPRECIATION	_____
VEH LICENSE, REG, TAX	_____
VEH STORAGE FAC RNTL	_____
OTHER	_____
MAINTENANCE	
MECHANICS SALARIES	_____
OTHER WAGES	_____
MECHANICS FRINGES	_____
OTHER FRINGES	_____
CASUALTY/LIABILITY	_____
MAINTENANCE SVC CONTR	_____
MATERIALS & SUPPLIES	_____
MAINT FACILITY RNTL	_____
EQUIPMENT RENTAL	_____
GARAGE & MAINT. DEPRECIATION	_____
UTILITIES	_____
SERVICES	_____
OTHER	_____
NON-VEHICLE MAINTENANCE	
JANITORIAL WAGES	_____
FRINGE BENEFITS	_____
SERVICES	_____
MATERIALS/SUPPLIES	_____
NON-VEHICLE MAINT. DEPRECIATION	_____
OTHER	_____
ADMINISTRATION	
ADMINISTRATORS SALARY	_____
MANAGERS SALARY	_____
DISPATCHERS SALARY	_____
SECRETARYS SALARY	_____
BOOKKEEPERS SALARY	_____

## WORKSHEET #25

### Variable Cost Identification

#### Incremental Cost Model (continued)

Expense Object Class	Fixed/ Variable
OTHER SALARY	_____
ADMINSTRATORS FRINGES	_____
MANAGERS FRINGES	_____
DISPATCHERS FRINGES	_____
SECRETARYS FRINGES	_____
BOOKKEEPERS FRINGES	_____
OTHER FRINGES	_____
MATERIALS/SUPPLIES	_____
CASUALTY/LIABILITY	_____
FUEL SVC VEHICLE	_____
TAXES	_____
SERVICES	_____
PURCHASED TRANSP	_____
EXPENSE TRANSFERS	_____
INTEREST EXPENSE	_____
AMORT OF INTANGIBLES	_____
TELEPHONE	_____
OFFICE RENTAL	_____
OFFICE & ADMIN. DEPRECIATION	_____
UTILITIES	_____
OFFICE EQPT RENTAL	_____
OTHER	_____

Reference Exhibit 58 in Workbook

**WORKSHEET #26**

**Incremental Cost Model**

**Expense Assignment: Year 1**

<b>Expense Object Class</b>	<b>Hours</b>	<b>Miles</b>	<b>Total</b>
<b>VEHICLE OPERATIONS</b>			
DRIVERS SALARIES	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____
FUEL OIL	_____	_____	_____
TUBES & TIRES	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____
VEH LICENSE, REG, TAX	_____	_____	_____
OTHER	_____	_____	_____
<b>MAINTENANCE</b>			
MECHANICS SALARIES	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____
MAINTENANCE SVC. CONTR	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____
SERVICES	_____	_____	_____
OTHER	_____	_____	_____
Total	\$ _____	_____	_____

**Reference Exhibit 59 in Workbook**



**WORKSHEET #27**

**Incremental Cost Model**

**Expense Assignment: Year 2**

<b>Expense Object Class</b>	<b>Hours</b>	<b>Miles</b>	<b>Total</b>
<b>VEHICLE OPERATIONS</b>			
DRIVERS SALARIES	_____	_____	_____
PSSNGR. AID SALARIES	_____	_____	_____
DRIVERS FRINGES	_____	_____	_____
PASSENGER AID FRINGES	_____	_____	_____
FUEL OIL	_____	_____	_____
TUBES & TIRES	_____	_____	_____
VEHICLE INSURANCE	_____	_____	_____
VEHICLE & OPER. DEPRECIATION	_____	_____	_____
VEH LICENSE, REG, TAX	_____	_____	_____
OTHER	_____	_____	_____
<b>MAINTENANCE</b>			
MECHANICS SALARIES	_____	_____	_____
MECHANICS FRINGES	_____	_____	_____
MAINTENANCE SVC. CONTR	_____	_____	_____
MATERIALS & SUPPLIES	_____	_____	_____
SERVICES	_____	_____	_____
OTHER	_____	_____	_____
<b>Total</b>	<b>\$</b> _____	_____	_____

**Reference Exhibit 60 in Workbook**





**WORKSHEET #28**  
**Incremental Cost Model**

**Example: Year 1**

<b>Basis of Assignment</b>	<b>Total Expenses Assigned</b>	<b>Value of Resource Variable</b>	<b>Average Unit Cost</b>
Hours	_____	_____	_____
Miles	_____	_____	_____
Vehicles	_____	_____	_____
<b>TOTALS</b>	<b>\$</b> _____	_____	_____

**Reference Exhibit 61 in Workbook**



**WORKSHEET #29**  
**Incremental Cost Model**

**Example: Year 2**

<b>Basis of Assignment</b>	<b>Total Expenses Assigned</b>	<b>Value of Resource Variable</b>	<b>Average Unit Cost</b>
Hours	_____	_____	_____
Miles	_____	_____	_____
Vehicles	_____	_____	_____
<b>TOTALS</b>	<b>\$</b> _____	_____	_____

**Reference Exhibit 62 in Workbook**



# WORKSHEET #30

## Incremental Cost Model: Years 1 and 2

### URTA Cost of Sample Service

Basis of Assignment	<u>Average Unit Cost</u>		Value of Resource Variable	<u>Total Cost</u>		Both
	Year 1	Year 2		Year 1	Year 2	
Hours	_____	_____	_____	_____	_____	_____
Miles	_____	_____	_____	_____	_____	_____
Total				_____	_____	_____

Reference Exhibit 63 in Workbook



APPENDIX

**COST COMPARISON METHODOLOGY FOR DEMAND-RESPONSIVE SERVICE**

Prepared for

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## INTRODUCTION

The purpose of the **Cost Analysis and Comparison Project for Transportation Providers in Maryland** is to assist local jurisdictions and non-profit agencies which receive statewide program funds in identifying and understanding their costs of transportation. The ability to identify and understand transportation costs will enable these recipients to manage their operations more efficiently and to compare their operating costs with those of other operators providing the same service.

Two different types of workbooks were prepared in this project. The first workbooks were developed to help local providers determine their transportation costs. Separate workbooks were prepared for both conventional, fixed-route systems and demand responsive systems. Guidance is provided in the workbooks on the development of both fully allocated and incremental cost models that can be used to determine the costs of individual services. Knowing the costs of individual routes or services is useful for management purposes and for satisfying the competitive bidding requirements mentioned in the Urban Mass Transportation Administration's Private Enterprise Policy.

The purpose of this workbook is to describe the general principles that should be used by demand-responsive and non-profit transportation providers in the comparison of cost proposals that have been prepared and submitted by public and private transportation providers. These principles follow the guidelines that were developed by the Competitive Services Board for cost comparisons. A companion workbook has been prepared for fixed-route providers.

Two major topics are discussed in this workbook. The cost comparison principles that were developed by the Competitive Services Board are presented in the chapter entitled **Principles of Cost Comparisons**. Principles of fully allocated costing, submission requirements for providers, and treatment of unique public or private costs are discussed in this chapter.

The consideration of the public agency's costs versus those of the outside contractors is presented in the last chapter entitled **Application of Costing Principles**. Consideration is given to the cost savings that may occur to the agency during the period of the contract (short-run savings) and over many contracts (long-run savings).

## PRINCIPLES OF COST COMPARISONS

A fair comparison of the costs of public and private providers requires that consistent and balanced evaluation principles be used. The Urban Mass Transportation Administration, in cooperation with the American Public Transit Association, established the Competitive Services Board, a broad range of public and private interests in public transportation, to address contracting issues such as cost comparisons. Through a series of meetings, the Competitive Services Board developed principles for the comparison of the costs of public and private providers<sup>1</sup>. Taken together, these principles represent a logical and balanced approach for the consideration and treatment of public and private sector costs.

The principles developed by the Competitive Services Board are discussed in this chapter. First, the principles of fully allocated costing are presented. These principles are incorporated in the costing methodologies that are included in the first workbook entitled **Cost Analysis Methodology for Demand-Responsive Service**. The submission requirements for providers are then discussed, including the level of detail that is suggested for public and private providers. Finally, principles regarding the treatment of unique costs, such as taxes and fees, are presented.

### Principles of Fully Allocated Costing

The Competitive Services Board recognized that a public agency has the responsibility to minimize public sector costs in the provision of public transportation services. Guided by this general objective, the Board adopted the following principles:

- o **All Costs Must be Considered in the Analysis.** The cost analysis should include the total costs of providing public transportation services. Total or fully-allocated costs include all direct and shared costs of capital, operations, and administration.
- o **All Government Subsidies Should be Considered as Costs.** Total cost includes all public sector costs regardless of the source of government funding. This

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<sup>1</sup> Competitive Services Board, "The Competitive Services Board's Principles on Cost Comparisons in Competitive Bidding," prepared for the U.S. Department of Transportation, Urban Mass Transportation Administration, Washington, D.C., 1986.

principle means that all operating and capital subsidies that are received from local, state and federal governments must be considered in the cost analysis.

o **Analyses of Subsets of Total Cost Should Be Conducted to Meet the Needs of Local Decision-Makers.** While the cost analysis should include all costs as mentioned above, this principle states that categories of cost should also be analyzed to address the key issues at the local level. In analyzing fixed and variable costs (or direct and shared costs), the local decision-maker should take into account that, upon contracting out, the public agency may not be able to eliminate all of the costs attributable to a service. Therefore, the short-run consequences of increasing or decreasing service should be determined.

o **The Cost Analysis Should only Include Costs for Functions that are Proposed for Contracting.** It is important to note that some transit agency functions cannot be contracted-out even in cases where organizations are ambitiously pursuing the privatization option. In addition, in many contracting situations, the public agency may decide to continue to perform some functions (e.g., maintenance, marketing or perhaps provide vehicle capital) consistent with the bid specifications for the proposed service that will be contracted-out. This principle states that the costs of these activities should not be included in the cost analysis.

The fully allocated costing principles are incorporated in the first workbook entitled **Cost Analysis Methodology for Demand-Responsive Service**. Therefore, it is assumed in the cost comparison methodology that fully allocated cost estimates or proposals have been prepared and submitted by the public and private providers. Details on calculating fully allocated costs are provided in the analysis workbook.

### **Submission Requirements for Providers**

The Competitive Services Board recommended different disclosure requirements for public and private providers because the public provider is not subject to the same "market" discipline as is the private provider. The Board was concerned that, without adequate disclosure of costs, the public operator may not show all of its costs. Therefore, the Board recommended that, in fully allocated cost comparisons, all public sector costs be shown, with an explanation of what costs are and are not attributable to the service in question.

The public disclosure recommendations can be met by documenting the cost estimation process that is outlined the first workbook entitled **Cost Analysis Methodology for Demand-Responsive Service**.

The process outlined in this workbook is consistent with guidelines developed by the Competitive Services Board.

On the other hand, for private operators, the Board recommended that only the "bottom line" cost is needed for cost comparison purposes because the private operator is subject to the forces of the competitive market. On average, the private, for-profit operator must bid his fully-allocated costs of providing service or, in the long term, go bankrupt. Therefore, on average, the public can be safely assured that the private operator is bidding on a fully-allocated basis.

However, there may be other reasons for requiring disclosure such as reassuring the public about the validity of the private operator's cost structure or guarding against "low-balling." Often, cost information by major function (e.g., administration, operations, maintenance) may be requested. As shown in Figure 1, this information is requested for each year of the proposed contract.

Public agencies must be careful in the level of information that they request from private operators. The need for detailed cost information should be balanced against the increased paperwork generated and the potential discouragement of bidders that are unwilling to disclose proprietary information that might become public knowledge under the freedom of information laws.

### **Treatment of Unique Costs**

There are certain costs that are unique to either the public or private sector such as taxes and fees, interest charges, and costs of contracting. The treatment of these unique costs can be an issue in cost comparisons. The issues surrounding these costs are discussed in the following paragraphs and recommendations are made in the summary paragraph regarding their treatment in the cost comparisons.

**Taxes and Fees.** The taxes and fees paid by some operators are revenue to the public sector, and, as such, contribute to the support of public services such as fire protection, parks and recreation, and public transportation. From the perspective of the national taxpayer, these revenues should be considered as an offset against the bid costs of those operators that pay them because they reduce the overall tax burden. The Competitive Services Board takes a more restrictive view and recommends that an offset be given only when the taxes and fees are earmarked for local transportation purposes.

There are two ways that the offsets can be handled, either as an addition to the public operator's cost proposal or as a credit to the private operator's bid. In either method, there are significant problems involved in the offset calculations. If an addition is

**Figure 1**  
**Sample Bid Form**  
**Private Providers**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Totals</b>
<b>Labor</b>				
<b>Operations</b>				
<b>Maintenance</b>				
<b>Administration</b>				
<b>Fringe Benefits</b>				
<b>Fuel and Lubricants</b>				
<b>Utilities</b>				
<b>Insurance</b>				
<b>Taxes</b>				
<b>Other Operating Costs</b>				
<b>Fee</b>				
<b>Total Operating Costs</b>				
<b>Capital Costs</b>				
<b>Total Costs</b>				

made to the public operator's cost proposal, the amount of hypothetical taxes that the public operator would pay must be calculated. While some taxes and fees like fuel taxes are easy to calculate, others, such as real estate taxes, require the assistance and judgement of outside experts. Differences of opinion regarding the hypothetical taxes and the cost of employing outside experts could make this method difficult to implement.

Likewise, the calculation of the proper credit to the private operator's bid can also be troublesome, particularly when the operator runs multiple services. To properly determine the credit in cases involving multiple services, the taxes and fees paid by the operator must be allocated among the operator's services and businesses. Questions about the proper allocation of taxes and fees could cause ill will and hurt relationships with private operators.

**Interest Charges.** The cost of capital equipment often includes interest charges. The public agency often has access to a lower interest rate than a private operator for two reasons: 1) the public agency is often larger and by virtue of its size and credit rating can obtain a lower rate; and 2) the public agency may be able to offer tax advantages to lenders. The Competitive Services Board recommended that no adjustments be made for differences in interest charges. The Board did suggest that, in cases where there are significant differences in interest charges, it may be preferable for the public agency to purchase the vehicles and lease them to the selected bidder.

Adjustments could be made to reflect the differences in interest charges, either as an addition to the public operator's cost proposal or as a credit to the private operator's bid. The main difficulty in calculating the adjustments is determining the differences in interest rates that result because an operator is a public agency. This calculation will require the assistance and judgement of outside experts. Differences of opinion regarding the correct difference in interest rates and the cost of employing outside experts could make this method difficult to implement.

**Costs of Contracting.** There are certain costs that will arise when services are contracted to the private sector, such as bid preparation, labor protection and contract management. To the extent that these costs are identifiable and unavoidable, the Competitive Services Board recommended that these costs be added to the bids received from outside contractors.

There are two issues that should be addressed in this area. The first issue is contract monitoring costs. It is important for contracting agencies to carefully question the monitoring costs that they feel are incurred because they are contracting out. In principle, the monitoring costs in terms of personnel should be the same regardless of the contractor (public or private) that is

selected if the same monitoring standards are applied to all. For example, the same manpower should be required to monitor missed trips, either for public agency operation or for operation by a private operator.

Labor protection is the second issue. There may be some costs that might be incurred because of the protections offered under Section 13(c) of the Urban Mass Transportation Act or the current bargaining agreement. It could be argued that these costs should be added directly to the bids of private operators. However, these costs are likely to be one-time costs for the right to contract out the specific service. Therefore, it is recommended that, as one-time costs, these labor protection costs should not be reflected in the bid costs of the private operators.

**Summary of Unique Costs.** While it is not stated in the guidelines produced by the Competitive Services Board, the general feeling of the Board was that the unique costs of public and private are in rough balance and that the differences will generally have little affect on the cost comparison. There was also a concern regarding the difficulty and cost of developing cost offsets to bids from public and private operators. Therefore, it is recommended that decision-makers be informed of these costs, but that no calculations or offsets be formally made.

## **APPLICATION OF COSTING PRINCIPLES**

The application of the cost principles involves the consideration of the agency's costs versus those of outside contractors. Specifically, it involves the consideration of savings that may occur to the agency during the period of the contract (incremental cost savings) and over the long-run (fully allocated cost savings). In addition, the accuracy of these cost estimates should be considered in the evaluation.

### **Cost Savings**

Contracting for demand-responsive services is done by specifying either the amount of service (e.g., hours, miles, passengers) that is to be provided or the level of budget that is available to provide service. The evaluation of cost savings under each of these situations is discussed in the following sections.

**Service Specification Contracting.** When the amount of service (e.g., hours, miles, passengers) is specified, the objective of the public agency is to obtain the service at the lowest cost. At first, meeting this objective may appear difficult because there may be concern about which cost estimate to use in evaluating cost savings, the fully allocated cost estimate or the incremental cost estimate. This will generally be true because the fully allocated cost estimate includes total costs while the incremental estimate includes only variable costs.

The cost comparison methodology takes advantage of both cost estimates to help local officials make informed contracting decisions and meet the requirements of the UMTA Private Enterprise Policy. The cost comparison process uses a "ceiling/floor" framework for the analysis of contract bids. The fully allocated cost estimate can be viewed as a "ceiling" for assessing submitted bids while the incremental cost estimate can be viewed as a "floor" in the same manner. With this framework, there are three possible situations that can occur. First, the bids from the private sector could be above the ceiling cost. In this case, the public agency should logically retain the service in-house because the private sector costs would exceed the fully allocated costs of public operation.

Likewise, the private bids could fall below the floor cost. The public agency in this case should logically award the contract to the private sector because the private sector costs are less than the incremental costs of the public agency.



The third situation, where the private sector bid is between the floor and ceiling costs, is the only scenario where the choice cannot easily be made. For example, the cost estimates may be as follows:

Public Agency Fully Allocated Cost Estimate	\$100,000
Private Sector Bid	\$85,000
Public Agency Incremental Cost Estimate	\$80,000
Cost Savings of Private Sector Bid	
"Long-Run" (\$100,000 - \$85,000)	\$15,000
Contract Period (\$80,000 - \$85,000)	(\$5,000)

In this case, the private sector bid (\$85,000) is greater than the incremental costs (\$80,000) of the public agency, but less than the agency's fully allocated costs (\$100,000). Local officials must weigh the costs to the national taxpayer as well as the contract period costs to the local transit agency. This is a policy decision that cannot be made through analytical means. However, as long as the fully allocated costs are made known and considered by local officials, this part of the process is consistent with the costing guidance contained in the UMTA Private Enterprise Policy.

**Budget Specification Contracting.** When the amount of budget is specified, the objective of the public agency is to obtain the maximum amount of service at the lowest cost. Like service specification contracting, there can be initial confusion in meeting this objective because less service can be provided if the fully allocated cost estimate for a public agency's services is used than if the incremental cost estimate is used.

For example, if the budget amount is \$160,000, and the fully allocated and incremental unit cost rates are \$24 and \$16 per hour, respectively, only 6,667 hours of service can be offered using the fully allocated estimate while 10,000 hours of service can be offered using the incremental cost estimate. This will generally be true because the fully allocated cost estimate includes total costs while the incremental estimate includes only variable costs.

There may be concern about which cost estimate to consider, the fully allocated cost estimate or the incremental cost. The cost comparison methodology takes advantage of both cost estimates to help local officials make informed contracting decisions and meet the requirements of the UMTA Private Enterprise Policy. Similar to service specification contracting, the cost comparison process uses a "ceiling/floor" framework for the analysis of contract bids. However, in this application, the positions of the fully allocated and incremental estimates are reversed. The amount of service that results from using the fully allocated cost estimate can be viewed as a "floor" for assessing submitted bids while the

incremental cost estimate can be viewed as a "ceiling" in the same manner.

With this framework, there are three possible situations that can occur. First, the bids from the private sector could be below the floor service. In this case, the public agency should logically retain the service in-house because the private sector would provide less service than the public agency could when the fully allocated costs of public operation are considered.

Likewise, the private bids could fall above the ceiling service. The public agency in this case should logically award the contract to the private sector because the private sector costs would provide more service than could the public agency when the incremental costs of the public operation are considered.

The third situation, where the private sector bid is between the floor and ceiling service levels, is the only scenario where the choice cannot easily be made. For example, the service estimates may be as follows:

Public Agency Fully Allocated Service Estimate (@\$24/hr)	6,667 hours
Private Sector Bid	9,000 hours
Public Agency Incremental Service Estimate (@\$16/hr)	10,000 hours
Cost Savings of Private Sector Bid	
"Long-Run" $[(9,000-6,667) * \$24]$	\$95,992
Contract Period $[(9,000-10,000) * \$16]$	(\$16,000)

In this case, the private sector bid (9,000 hours) is greater than the fully allocated service estimate (6,667 hours) of the public agency, but less than the agency's incremental service estimate (10,000 hours). Local officials must weigh the costs to the national taxpayer and the contract period costs to the local transit agency as well as the potential gains (losses) in the amount of service provided. This is a policy decision that cannot be made through analytical means. However, as long as the fully allocated costs are made known and considered by local officials, this part of the process is consistent with the costing guidance contained in the UMTA Private Enterprise Policy.

### Accuracy Considerations

It is important to recognize that there is error inherent in any cost estimate, regardless of the sophistication of the costing methodology. Some agencies, notably the Los Angeles County Transportation Commission, acknowledge this problem in their cost comparison process and require that the expected cost savings of contracting with the private sector meet a minimum threshold. In Los Angeles, the threshold is 20 percent --- that is, the private sector bid must be at least 20 percent less than the public sector

cost estimate before a bid is awarded to the private operator. Therefore, if the public sector cost estimate is \$90,000, the private sector bid must be 20 percent less (\$18,000) or under \$72,000 (\$90,000 - \$18,000).

It is recommended that this concept of threshold savings be considered for incorporation in the cost comparison methodology. Since the threshold value should reflect local sensitivity to risk, it is recommended that the threshold percentage be set by local officials. A starting point of 10 percent might be a good starting point in these discussions.







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